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ABSTRACT

This publication was prepared to: (1) update and expand elementary, secondary, and college teacher's knowledge of materials on noncomputer-based games and simulations relating to the teaching of economics and corresponding social studies topics; (2) assist economic educators in developing criteria for evaluating the educational usefulness of exercises; (3) provide guidelines for game creation with existing resources; and (4) provide suggestions as to how one can best use games and simulations in the classroom. The book represents a substantial revision and expansion of two earlier bibliographies (1968 and 1971) which were distributed by the Joint Council on Economic Education. Selected articles and resource references are included to supply valuable information to the classroom teacher and curriculum specialists. A new section on game construction is provided to make this reference a source of value not only for teacher workshops but also for collegiate instructional methods classes. Contents are arranged in four chapters on (1) construction, selection, and use of simulation games for teaching economics; (2) research on instructional games and simulations in the social sciences and economics; (3) an annotated listing of 130 available simulations and games for the teaching of economics, 80 of which were not included in the two earlier bibliographies; and (4) bibliographies, journals, and publishers of educational games and simulations. (Author/SJM)

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Joint Council on Economic Education

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and William E. Becker, Jr.

Educational
Games and Simulations
in Economics

1974

Joint Council on Economic Education

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Preface

This publication has been prepared primarily to update elementary, secondary and collegiate principles teachers' knowledge of materials on noncomputer-based games and simulations relating to the teaching of economics and corresponding social studies topics. As a further service it also includes selected articles and resource references which can supply valuable information to the classroom teacher and curriculum specialist. This book represents a substantial revision and expansion of two earlier bibliographies which were distributed by the Joint Council on Economic Education.

Eighty new games not previously annotated are among the 130 included in this edition. It is significant that the thrust of these new games is toward how society approaches solutions to problems such as environment, urban planning, economic development and distribution of wealth. A new section on game construction will help to make this reference source of great value not only for teacher workshops but also for collegiate instructional methods classes.

We are indebted to Professors Darrell R. Lewis, William E. Becker, Jr., and Robert Reinke at the University of Minnesota's Center for Economic Education and Professor Donald Wentworth at Pacific Lutheran University's Center for Economic Education for their willingness to undertake this project and to provide economic education with a continuing repository of information in this area. We are also indebted to the many teachers and researchers who are currently trying out and evaluating the many games and simulations available.

S. Stowell Symmes
Director of Curriculum

January 1974

Table of Contents

Introduction
Chapter I. Constructing, Selecting and Using Simulation Games for Teaching Economics 5
- A. Constructing a simulation game for teaching: A case in consumer economics 6
- B. Constructing a simulation game for teaching: A case in economics for elementary social studies 20
- C. Selecting a simulation game for teaching: Questions and criteria 29
- D. Using games and simulations for classroom instruction: Cautions and procedures 43
- E. References relating to the construction, selection and use of educational simulations and games in economics and the social sciences 49

Chapter II. Research on Instructional Games and Simulations in the Social Sciences and Economics 61
- A. Reviewing the literature: A review of research on instructional games and simulations in social science and economic education 61
- B. Identifying the references: A survey of research completed in the area of social science simulations and games 76

Chapter III. Annotated Listing of Available Simulations and Games for the Teaching of Economics 93

Chapter IV. Bibliographies, Journals, and Publishers of Educational Games and Simulations 129
- A. Bibliographies 129
- B. Journals and newsletters 130
- C. Names and addresses of distributors and publishers 130

Introduction

Introduction

At a time when new teaching materials and techniques are being developed daily it is difficult to find innovations that capture the imagination and enthusiasm of their users to the degree which has been accomplished by educational games and simulations. In education, yesterday's innovative fad is often as popular as yesterday's baseball hero. However, this has not been true of games and simulations. Since their introduction to precollege classrooms in the middle 1960's, their creation and use, and the discussion of their educational worth has increased geometrically each year. This public and professional attention and the resulting new games make any publication on the subject quickly outdated. For this reason the Joint Council on Economic Education, recognizing its responsibility to provide educators with up-to-date information on all facets of economic education, decided to revise and expand its earlier (1968 and 1971) bibliographies of games and simulations to include as many of these new developments as were publicly available.

A second major reason for expanding this publication was to assist economic educators in developing criteria for evaluating the educational usefulness of these exercises, provide guidelines for game creation with existing resources, and provide suggestions as to how one can best use them in the classroom. No full-time teacher can be expected to remain both informed and experienced enough to read, use and evaluate everything available in this area. It is hoped that this publication services these needs in economic education.

In September 1970, the Joint Council on Economic Education designated the Center for Economic Education at the University of Minnesota as the national repository for games and simulations in economic education. During the past years the Center has purchased many and reviewed all of the simulation-games relating to economics which are identified in this report. In collaboration with other Centers, game designers and the Joint Council, an evaluation form has been developed and is currently being used by teachers in Minnesota who are trying out many of the exercises identified herein.

Criteria for Inclusion

The following rationale established the project's criteria for including (or excluding) the simulation-games found in this publication:

1. The exercise had to meet a working definition established by the Center for the terms educational simulation, game, and/or simulation-game. The literature of the field abounds with controversy over what is meant by these words. The developers of the project found the following definitions to be of working value to them:

> A learning *game* is a model of student interaction which usually involves a "winner," and the winner is a person who has learned enough content to

win the game. The game essentially provides a competitive setting for the learning of subject matter content.

Simulations are an attempt to model a portion of reality in an artificial situation. They reproduce the social, economic or political processes of particular systems of social interaction. Students assume roles in the system and try to understand how the system operates by participating in it as a member, not an observer.

A *simulation-game* is a combination of these models which tries to use the role-playing, modeling features of simulation for learning how a system operates and the competitive nature of games to encourage student motivation. Most exercises available and identified in this publication have both of these characteristics.

2. The exercise had to involve the use of economic behavior, goals and/or concepts. This gave the project a very broad range of exercises to include. Exercises ranged from some that were restricted entirely to simulating economic behavior to others that dealt with ecology, urban planning and history. However, no matter how diverse the range of subject areas, at the least they illustrated allocation decisions and reactions to material scarcity. This criterion for inclusion allowed the project sufficient breadth of purpose to serve many teacher needs as well as appropriate narrowness of purpose to give the publication a central focus.

3. The exercise had to have a general education application. The project included exercises available primarily for the elementary and secondary levels although some are applicable for college use as well. Business management games and advanced undergraduate or graduate level simulations were excluded.

4. All the exercises identified had to be commercially and/or publicly available. This was the most stringent test. In most other bibliographies and publications dealing with games and simulations, many of the exercises are, unfortunately, not publicly available. In many instances, the exercises do not ever become available and readers begin to doubt the credibility and usefulness of such publications as reference documents. This publication does not discuss nor annotate such exercises.

Undoubtedly, this publication commits some errors of omission. Much excellent work is done by individuals and schools which never receives publicity and which never is exposed to others; much that is written and published is never distributed and therefore difficult to identify in a project such as this.

How to Use this Publication

Educational Games and Simulations in Economics is divided into four chapters. These divisions are meant to give readers clear identification and efficient access to available materials in the field. It is anticipated that this information will be of use to readers with differing concerns—i.e., educational researchers, game designers, or elementary and secondary classroom teachers. Each chapter is introduced for the purpose of quickly identifying its contents and who would most benefit from it.

Chapter I pertains to constructing, selecting and using *Educational Games and Simulations in Economics*. This section is particularly valuable to classroom teachers and/or department chairmen for the purpose of gaining "how to do it" or "how to do it better" skills.

Chapter II presents a review of findings and annotations of the current research on instructional games and simulations in the related social sciences and economics. This section can be useful to any member of the educational community, but should be of greatest interest to anyone contemplating further research in the area.

Chapter III contains an annotated listing of all currently available simulations and games for the teaching of economics and related topics which fit the "Criteria for Inclusion" as described above. This section represents the heart of the publication. Each annotation identifies the simulation-game title, its source of distribution, the subject it deals with, its specific grade level(s), approximate playing time, cost, the number of participants needed, and a description of its procedures and objectives.

Chapter IV contains a listing of other published games and simulations bibliographies and of journals currently addressing themselves to this area. It also identifies the names and addresses of publishers and/or distributors of the educational games and simulations identified in this publication.

In summary, it is intended that this publication service a need in the field of economic education. We recognize that the use and availability of games and simulations in economic education will continue to change. Consequently, it is hoped that this publication, particularly the bibliographical component, can be revised every two or three years to meet these changes. Likewise, we hope that readers will provide us with the names and producers of additional simulation-games as they become aware of them. Direct this information to Games and Simulations Project, Center for Economic Education, 1169 Business Administration Building, University of Minnesota, Minneapolis, MN 55455.

CHAPTER I

Constructing, Selecting and Using Simulation Games for Teaching Economics

Chapter I consists of five parts—the first two deal with the construction of simulation games, the third addresses the selection processes which should be followed in choosing a game for classroom use, while the fourth considers the actual use of simulation games within the classroom setting. The fifth part provides a complete listing and brief description of references relating to the construction, selection and use of games and simulations in economics and the other social sciences. The material contained in Chapter I should be extremely helpful to elementary and secondary teachers who are considering constructing their own simulation game or are considering the use of an existing game within the context of a social studies curriculum.

The first two parts dealing with the construction of an educational game represent the most thorough description of what is involved in producing and refining such a game. "A Case in Consumer Economics" is a study which analyzed the development of the game *Consumer*. This analysis is done within the framework of both required and desirable criteria for pedagogical simulation at the intermediate or high school level. Numerous processes and criteria which constitute the technique of simulation game building are presented. "A Case in Economics for Elementary Social Studies" focuses on the playability problem inherent in the development stages of a simulation game. The development of the *Caribou Hunting Games* is used to demonstrate the systematic planning and design which must go into a pedagogical game which is implementable at the elementary level.

Part C is devoted to evaluation and selection criteria appropriate for choosing a simulation game. Criteria referencing is presented as a method of establishing the capacity of a game to provide a sound and interesting learning experience for students. Six key questions are suggested for analyzing and identifying the knowledge base of any pedagogical game.

Part D, "Using Games and Simulations for Classroom Instruction," emphasizes the importance of the teacher and his or her influence on student activity during a gaming experience. Organizing, playing and debriefing strategies are presented as the operational basis for any effective pedagogical game activity.

A. Constructing a Simulation Game for Teaching: A Case in Consumer Economics*

Gerald Zaltman

This paper is essentially concerned with the problems and considerations involved in constructing a simulation game for teaching. Insofar as the problems and criteria involved in the construction of social simulation games as teaching tools are similar to those involved in constructing other kinds of simulations, this paper may also have some relevance for the construction of simulations with other objectives. In the discussion to follow, examples will be provided from one particular game, Consumer. This game exists in two versions—a board (all-man) game, and a computer-based (man-machine) game. The board version is the most thoroughly tested and will be the basis for discussion.

The basic activities in constructing a simulation for pedagogical purposes are:

1. Defining the instructional objectives of the game
2. Defining the target audience
3. Defining the model and theoretical assumptions of the underlying social processes to be taught
4. Operationalizing the model
5. Testing the simulation

The entire game building enterprise involves trade-offs. Few procedures can be considered unchangeable. For example, it may be necessary to take some poetic license with the model in order to better achieve some instructional objective. Or, after field testing, it may be found necessary to restrict the intended audience in order to make the game more playable for some particular group. However, not all changes involve compromises. The processes of operationalizing and testing a model may highlight inadequacies in the model or its assumptions and suggest further necessary changes. From an instructional standpoint, we decrease the likelihood of teaching the wrong things. From the standpoint of theory construction, we have further refined one formulation of the functioning of a social process.

INSTRUCTIONAL OBJECTIVES AND INTENDED AUDIENCE

No attempt will be made here to describe or document the extent to which consumers in all socio-economic groups experience problems in using credit. Suffice it to say that the problems are widespread and all too frequently cause serious trouble. The major objectives of Consumer are oriented toward these problems.

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*Reprinted with permission of Macmillan Publishing Co., Inc., and the author, from "Simulations for Learning: A Case in Consumer Economics," in Michael Inbar and Clarice S. Stoll, Eds., *Simulation and Gaming in Social Science*, pp. 125-145. Copyright © 1972 by The Free Press, a division of Macmillan Publishing Co., Inc. Gerald Zaltman is A. Montgomery Ward Professor of Marketing at Northwestern University. If more reference information is desired, please refer to the original article.

Briefly, the game is structured in such a way as to encourage consumers to:

1. Weigh the added cost of financing a purchase against the additional value of possessing the item immediately;
2. Consider the opportunity costs of the purchase, that is, to determine whether there is another use of their money that will yield greater utility; and
3. Guard against unanticipated events not generally covered by insurance.

As a result of interactions in the game between consumers and credit agents, players learn:

1. To compare the interest rates charged by different financial institutions;
2. To expect credit rating to affect the ability to borrow;
3. To understand fully the implications of contracts before signing; and
4. To appreciate the mechanics of that sector of the economic system concerned with consumer credit.

At the outset I decided to develop a game for use among adolescents with varied learning abilities and different social backgrounds. I later discovered that with some modifications the game could also be used successfully among adults of differing backgrounds and capabilities. Thus the audience for the game became a large and heterogeneous one.

THE MODEL

Like most other social simulation games, Consumer makes a key theoretical assumption concerning behavior: It assumes behavior by purposive, goal-oriented, self-interested individuals. The selection of roles and structuring of relationships among players form the essential components of the game model. There are two competitive roles in Consumer: three players take the roles of credit agents (a bank loan officer, a department store credit manager, and a finance company loan manager), and as many as twelve players take the role of consumers. In addition, there are two purely administrative roles: a salesman and a coordinator (who also functions as a judge in case of disputes).

A general problem in simulation games is that some roles (seldom more than one or two in any simulation) are necessary for the functioning of the game but may be boring for the players. Hence, the players in these roles may lack motivation. This problem of passivity among students has long been of concern to educators trying to heighten involvement in the usual lecturer-audience classroom setting. In simulation games it is usually handled on an *ad hoc* basis in each game session. For example, passive roles are good positions in the first play of a game for students who lack self-confidence or who are easily discouraged by competition. These roles are good introductory positions from which to move such players into more challenging roles. Also, as different levels of complexity are added to a game, formerly passive roles may become quite active. An example of this in Consumer is the role of salesman (to be discussed later).

The behavior of purposive, self-interested actors in a game is determined partly by the goal-specifying rules. In Consumer the consumer's goal is to maximize the satisfaction obtained from his purchases; the credit agent's goal is to maximize returns from the business he conducts. In pursuing these individual goals, it becomes evident to consumers that a relationship with the credit agent may be profitable, and vice versa. Thus, mutually beneficial exchange relationships develop between players in different roles who are trying to further their own self interests. As in real life, some exchange relationships are better than others, and mechanisms are included to allow consumers and credit agents to discriminate among differentially profitable relationships. (Players don't have to exercise this judgment, although sooner or later they usually do.) Perhaps most importantly, players are not *required* to enter into any exchange relationships; that they do is the result of motivations provided by their respective goals. Formal provisions concerning the relationship come into operation only after the decision to enter into an exchange relationship with another player is made.

The structural model of relationships between credit agent and consumer is at once cooperative and competitive. The individual goals of players in the two roles make cooperative exchange relationships desirable and mutually profitable. The conditions of the game serve to establish a "bargaining range" within the limits of mutually-profitable exchanges. An essentially competitive relationship develops in determining where whithin this range a formal agreement will be concluded. The competition revolves around such factors as what collateral the consumer should put up and what special provisions should be added to the contract to cover various exigencies. How hard a bargain the credit agent or consumer is able to strike depends upon such things as his negotiating skill, the availability of alternative relationships, and an understanding of the utility the other player is placing on the present transaction. For instance, a credit agent will be in a relatively good bargaining position with a particular player if there is a sizeable demand for his money among other consumers and if he knows that the borrower is having a difficult time securing funds from other sources. This, of course, means that those who have more information about the economic state of affairs of other players have an advantage over those who do not.

The game further assumes that a consumer places differential priorities on items; there are some goods and services that are more desired and conse-

Table 1

Schedule of Utility Points Assigned to Purchased Items Over Time

	Months (Game Rounds)			
Item Purchased	*1–2*	*3–4*	*5–6*	*7–8*
Kitchenware	27	25	23	21
Refrigerator	240	200	170	150
Bed	100	75	50	25
Chair	34	30	27	25
Sewing Machine	55	55	55	55
Clothes	40	40	40	40
Rug	45	45	45	45
Vacuum	52	60	68	76
Vacation	56	60	64	68
Table	22	25	28	31
Washing Machine	135	150	165	185

quently those purchases are preferred earlier than others. In other words, our self-interested, goal-oriented consumer can be expected to have a psychological structure or schedule of rewards reflecting his time-ordered preferences for various items. This is simulated for all consumers by assigning each item with a different specified schedule of utility or satisfaction points. (See Table 1.)

Consider first those goods and services which are very important because their functional need is great; for example, the need for a refrigerator when none is present in the home or apartment. In this instance there is a cost involved in going without the needed item. To simulate this dissatisfaction resulting from deferred gratification, the number of utility points received for the purchase of such goods decreases as the game proceeds. If a refrigerator is purchased (the price being $200) in the first or second month of the game, the buyer receives 240 utility or satisfaction points. Only 150 points are received if the purchase is made during the last two months in the game. This does not mean that a refrigerator is any less useful in one month than it is in another. Rather, if it is an important item, as it is assumed to be in this game, then there is also an important "cost" or dissatisfaction incurred by going without it.

Other goods and services sold in the game increase in utility or satisfaction points as the game proceeds. The satisfaction points start at less than the dollar cost of the item and exceed the dollar cost at the end of the game. Thus, a week-end vacation which costs $60 yields 56 satisfaction points if deferred until the end of the game. One reason for such structuring of this group of items is to teach about opportunity costs. When a consumer foregoes one purchase in order to make a less satisfying purchase, he suffers an opportunity cost which is the difference in satisfaction between the two items. Since it is possible to purchase all the items in the game, an opportunity cost occurs only when buying a particular item means postponing a more rewarding item until a time period in which the utility or satisfaction points have dropped. During field testing I learned that this wasn't always clear to all players for whom the game was intended. Therefore, I decided to take some poetic license with the structuring of utility points and lowered the utility points for some items when purchased early in the game. In effect, players are over-penalized for purchasing a less-needed and therefore less-rewarding item early. This was found to be necessary to facilitate discussion of the opportunity cost concept among younger players and older slow learners.

Quite apart from consideration in teaching the opportunity cost concept, a schedule of increasing satisfaction points is consistent with the time-ordered psychological preferences consumers may have for some items. There are some items for which our needs or desires are cumulative in the absence of satiation. While the need for a refrigerator may be no less in December than it was the previous March, the need for a vacation may be greater in December than in the previous March if there were no vacations in between. Also, some items become increasingly important over the family cycle as a result of changed during the family life cycle. As the family size increases from two to three, etc., so does desirability of owning a washing machine in lieu of using the laundromat. Consequently, the absolute value of owning a washing machine may increase over time.

OPERATIONALIZING: THE GAME SIMULATION TECHNIQUE

A model is operationalized primarily by means of a set of rules. The formal social structures in a game are derived directly from those rules. The informal social structures have their origins in the behavioral phenomena which emerge as by-products of these rules. Generally, the fewer the rules, the better the game. The physical equipment used in a game is also important in operationalizing a game. The use of various kinds of rules and equipment in operationalizing a game will be the concern of this section.

The discussion is organized around a number of pedagogical criteria which I have somewhat arbitrarily divided into two categories. The first category, that of the required criteria, includes the following three features: (1) the game must be self-sustaining; (2) the game must be self-judging; (3) the game must contain feedback mechanisms. The second category, that of the desirable criteria, includes the following characteristics: (1) the game should be simple enough to make relevant features salient; (2) the game should contain levels of complexity which can be affixed in a step-wise fashion; and (3) the game should allow alternative strategies.

Self-Sustaining

A simulation game is self-sustaining when the activities or processes embodied in the model function primarily as a result of their mutual relationships with each other. Three operational conditions must be met for the game to be self-sustaining. First, provisions must exist to overcome problems created in the process of abstracting a set of processes from a larger environment and in the process of operationalizing the game itself. Second, the game should be self-disciplining: that is, the formal and informal game structures should be able to correct aberrant behavior. Finally, only action by players should be necessary. After the game starts, participation or intervention by persons external to the game (teachers or administrators) should not be required. Let us turn now to a consideration of these operational conditions.

Social activities and the relationships among these activities are part of a social system. Homans and numerous others have pointed out that a given social system also exists in an environment of other systems with which it may have reciprocal causal relationships. Consumer behavior, for example, influences and is in turn influenced by other social activities. When constructing a model one necessarily abstracts a system out of its environment of other systems with which it has a causal dependence. The problem that simplification creates is that part of the motivation for action in the game may be the result of processes in other systems which have been "ignored." It becomes necessary, then, to compensate for abstraction without unduly increasing the complexity of the model.

One technique is through the use of ***environmental response rules***. These rules represent the likely behavior of relevant but missing parts of the environment. In Consumer processes in such life areas as health planning and the job market are not simulated even though happenings in these areas have important bearings on one's financial needs and the decision to borrow money. Instead of introducing these processes themselves, I took the ***probable*** consequences of these processes (for instance, being unemployed or having a medical expense not covered by insurance) and introduced them into the game through "chance cards." These cards serve to connect in at least a minimal way the consequences of one or more sets of processes in one system, (the labor market) with the operating model of an on-going set of processes in another system (the credit sector of the economy). These consequences, happening on a probabilistic basis, are inputs important in keeping the simulation dynamic and self-sustaining—they provide part of the impetus for having to make such financial decisions as are necessary in the game. (It is also a relatively easy procedure to alter the chance cards to reflect the differential likelihood of certain events among particular socio-economic groups.)

For a social simulation to be self-sustaining it must also provide mechanisms within the game to correct deviant behavior. Such behavior may have two origins. One type of deviant behavior, *strategic deviance*, has its roots in the intentional structure of the game. For instance, credit agents in Consumer are encouraged through the structure of the game to test the limits of their clients' gullibility and/or carelessness. One result is that the credit agents can be misleading in their advertising and in the contracts they require consumers to sign. Such deviance may be a good short-run strategy. Hence the game must also provide legal proceedings. These are specified by mediation rules which concern conflict situations in which neither party to the conflict has the power to resolve it. In Consumer, the coordinator temporarily becomes the judge and suspends activity in the game. The consumer and credit agent each have one minute to present their versions of the dispute along with whatever evidence they have. The judge, using a set of guidelines provided in the game, makes a decision which is binding on both players. In this way deviant behavior is corrected (to the extent that it is contrary to the legal facts of life), and it is also prevented from disrupting the game for the two players.

Potential conflict situations were deliberately included for their instructional value. Most trouble arises between consumers and credit agents because the consumers are often careless in reading their contracts and filling them out. When a credit agent exploits this carelessness and the consumer discovers it, the consumer will usually institute legal action. The publicized outcome—usually against the consumer—often has a very sobering impact on all consumers. Generally, comparisons of contracts signed after the first court case with those signed before show a great deal more understanding and caution among consumers after the court scene. Afterwards, consumers spend more time reading the contract. They ask for definitions of terms such as collateral and repossession, and they make sure they obtain exact copies of the contract with the credit agent's signature. Thus, the court scene constitutes a very important learning experience for *all* players; the consequences of certain behavior (e.g., being too misleading in advertising or too careless in reading a contract) are demonstrated.

Notably, the behavior resulting in legal proceedings arises informally as a result of other formal structure in the game. The game rules concerning court action simply provide guidelines *after* the situation comes about. An alternative technique would have been to increase the number of behavioral constraint rules: formal rules prescribing the do's and don't's for the credit agents when having a consumer sign a contract, so that they could not be misleading within the framework of the game. This procedure would attempt to teach by having students automatically go through or be exposed to the correct motions. Earlier versions of Consumer were in fact like this latter type. It was found, however, that this approach was a far less effective way of conveying information about contracts. Moreover, it made the game more complicated for credit agents since they had more rules and formal procedures to follow. This structure was both less interesting *and* less realistic.

The second kind of aberrant behavior, ***recalcitrant deviance***, is more deeply rooted in a player's extra-game attitudes. It may be intentional, as when the student simply fools around; or it may be unintentional, as when a student has a negative reaction to the element of competition. Nothing in the formal rules of any simulation can require players to cooperate in the conduct of a game session. In this regard, simulations are very much like other teaching techniques: students cannot be forced to involve themselves in whatever manner the instructor may want. The fact that social simulation games seem particularly effective in involving inattentive or hard-to-control students in normal classroom contexts may be explained in large measure by the effectiveness of peer group pressures toward cooperation. If a player fools around too much, the group activity—the social simulation—can't operate smoothly. It is quite interesting to watch how efficient other players are in securing the "deviant's" cooperation in a game session, whereas in other classroom settings the same deviant is often encouraged by his peers to be disruptive.

Needless to say, the game designer should do all he can to augment the inherent qualities of a social simulation in correcting disruptive behavior of this type. One problem I faced in Consumer was cheating. For example, there was a tendency in early versions for some players to take product cards from others or alter credit information on their own record sheets. Such deception was corrected by the simple device of having those in non-consumer roles use special color-coded pencils. It then became an easy matter when a complaint or suspicion arose to compare the items circled in green by the salesman on a consumer's record sheet with the product cards displayed in plastic envelopes. (The two should be identical; if a player has more items than those circled by the salesman, he has items which don't belong to him.) Also, the coordinator can determine whether a monthly installment due the Finance Company, for instance, has been properly paid by observing whether an orange check mark has been placed in the appropriate square. If nothing has been checked or if another kind of marking has been placed there, then that installment has not been taken care of properly. The player will not be allowed to continue into the following month until he has either told the coordinator he intends to skip that payment (in which case the coordinator records it for the Finance Company's knowledge) or until he has settled the matter with the Finance Company.

There is another form of recalcitrant deviance—this one, however, is unintentional. Some students try to avoid openly competitive situations or withdraw from such situations as soon as they begin to fall behind. It is important, therefore, that structures exist in the game that minimize both forms of withdrawal. The obvious countervailing structure is a cooperative relationship. Cooperation provides for mutual reinforcement and puts social pressure on a player to continue active participation in the game session when others' strategies are dependent upon his. Consumer can be readily adapted to prevent player withdrawal by having multi-member consumer units. I found this device to be especially effective among junior high school groups and others who are easily upset by adverse chance cards. Another technique is to have players proceed through the various months of the game at the same time rather than have them work at their individual speeds. This can minimize feeling of "falling far behind" induced among slower players by those who complete the game quickly.

Yet Consumer may still have problems of withdrawal because there is a relative lack of interdependent strategies among players in the same role. This is not to say that players in the same role do not cooperate. To the contrary, they often do, but this informal behavior is the indirect result of informal relationships between consumers and credit agents. The credit agent is sometimes seen by consumers as a common challenge or adversary about whom it is worthwhile to exchange information. Also, aggressiveness on the part of credit agents may overcome withdrawal or hesitant behavior on the part of consumers. A consumer sitting down inactively is an easy target for credit agents to approach. Even if a borrowing transaction is not consummated, the interaction between the two players is usually sufficient to motivate the consumer to become more active. This is partly because a credit agent may outline for the consumer what appears to be good competitive strategy.

Self-Judging

To be self-judging, the scoring system should lie entirely within the model or structure of the game. Points must be earned or lost solely on the basis of what happens in the game and not by a teacher's evaluation of a player's performance. Points are not the only means by which success or goal achievement in a game may be measured, but they are the most frequently used means.

Furthermore, it should be evident to players that their standings at the end of a game are a direct result of their actions in the game. Whether it is "more" or "less" is partly influenced by the player's perception of the role of chance or luck in the game. It is important in Consumer that students not perceive the game outcome to be overly influenced by the environmental response rules, over which they have little control.

There are two types of environmental response rules. One, mentioned earlier, is where the likely response of the environment is determined throughout the game. It assumes or is concerned with one-way causation. For instance, there is a certain probability that a chance card will be drawn saying, "Your spouse is unemployed; receive only $50 next month." This probability can be adjusted to reflect reality for the particular group playing the game, but once fixed, it remains constant throughout the session. The second type of environmental response rule is more concerned with instances characterized by reciprocal feedback relationships between the model being simulated and relevant but missing parts of the environment. There are no instances of this type of rule operationalized in Consumer. Being employed or unemployed influences the need to borrow money but borrowing money doesn't influence one's employment.

The likelihood of a player attributing his performance in a game to luck or chance seems smaller with the latter type of environmental response rule, if only because the player is better able to understand the derivation of the probabilities contained in those rules. The environmental response rule in this case constitutes a particular feedback mechanism. When the first type of environmental response rule is the sole or dominant type in a game it becomes important to place greater emphasis on other feedback mechanisms. Players should not be allowed the opportunity for excusing their performance over a series of plays as a result of bad luck. Feedback mechanisms are countervailing forces to the chance elements by making more salient the fact that the consequences in the game are primarily a function of the choice of actions or strategies, including responses to chance cards.

Feedback

It is essential that an educational simulation game be constructed so that a player is able to evaluate the effectiveness of particular strategies. The efficacy of social simulation games lies largely in the fact that they demonstrate to players the consequences of behavior by having them experience those consequences. Most easily, at the conclusion of a game session one can have the players receiving the highest and lowest scores describe their strategies and experiences. It is desirable, however, that some mechanisms exist whereby players are able to evaluate their strategies during the course of the session. Positive and negative reinforcements in the course of a game session will guide game behavior toward the more rational behavior patterns that the simulation is designed to teach. For example, as a player receives feedback to the effect that payoffs on a particular strategy are low, he will begin to search for and test alternative strategies. As a consequence, players will pay extra attention to the rewards and penalties attendant upon the strategies of others and thus learn from other players' experiences as well as from their own.

Feedback in Consumer is largely public. All products bought by consumers are represented by cards which are placed in a plastic display holder upon purchase. The holders are located together in a central part of the room. Simple inspection of the product cards helps a player decide, for example, whether he is purchasing items in the best sequence. Another form of feedback in the game, discussed earlier, is through court action. This procedure is a way of telling each player whether his behavior in borrowing transactions is presenting any undue risk.

Finally, the use of record forms provides feedback during the course of a game. Consumers have a simple record sheet. One section, filled in by the credit agents, contains information about the number of borrowing transactions a consumer makes, the terms of the different transactions, and the consumer's repayment history (whether installments have been missed or whether repossessions have occurred.) This sheet was initially intended to serve two functions. One was to simplify certain bookkeeping tasks, and the other was to simulate a credit rating service. A credit agent could determine quite quickly whether a consumer was a good credit risk or a poor one by inspecting the information in this section. The responses of the credit agents to this information provided feedback to the consumers as to how well they were preserving their borrowing power. In addition, it also developed that credit agents used this same set of information to keep track of how well their competitors were doing since these sources of credit were also recorded. Credit agents were thus provided with feedback mechanisms about their relative standing and about their differential inclinations to assume risk.

Levels of Complexity and Simplicity

Different levels of complexity of games enable the instructor to start a session at the level providing the optimal challenge for his class. Additional levels may then be added in a step-wise fashion so that the student is gradually introduced into an increasingly complex learning situation. Also, game sessions at different levels of complexity may be conducted at the same time where participants of widely differing abilities are in the same class. What is important is that the different levels of a game be compatible with one another. The different levels ought not to make different theoretical assumptions about behavior; they should all be consistent with the goal-specifying behavior included in the most elementary level but should accomplish relatively independent teaching objectives.

There are three levels of complexity in Consumer. The first level, which concerns the credit use behavior of consumers, was described at the beginning of this paper and has provided all illustrations used. The second level concerns product differentiation. In this version there are no credit agents. In their place are three salesmen, each of whom represents a different firm or brand line. The items they sell differ in quality and potential for breaking down, wearing out, etc. As a consequence, satisfaction from their purchase may vary from brand to brand. The salesmen compete in trying to make the most sales. Consumers have buying guide literature available if they want to use it. The information contained in this literature is usually but not always accurate, so that effort to obtain additional information prior to buying will usually but not always pay off. In the third version there are both credit agents and salesmen. Pressures on consumers to borrow and buy are greater because the consumer has two sources of influence directed toward him instead of just one as in the other two versions. Moreover, the salesmen, whose goal is to make more sales, and the credit agents, whose goal is to make more safe credit transactions, will coordinate their behavior to increase the efficiency of their influence process.

There may also be a nesting of steps within different levels. The credit-agent-only version may be simplified by omitting any of the following elements: contracts, one or two of the credit agents, and chance cards which apply to time periods other than the one in which they are drawn. Or a game may begin with just two credit agents, which reduces the number of alternatives a consumer has to consider. In a second play all three credit agents would participate and would require the signing of contracts. The addition or deletion of various elements in the game results in a change of emphasis on the different instructional objectives. Therefore, in deciding which level to use or which steps within a level to omit, the instructor must also consider the impact the changes will have on what the game teaches.

Alternative Strategies

It is desirable to incorporate more than one possible course of action for each player in a social simulation game. This is generally realistic in that there are usually alternative strategies or sets of goal-oriented behaviors which may be followed in most social situations. The social phenomena being simulated determine the number and kind of strategies available to be incorporated in a game. Then operational and pedagogical considerations determine the strategies actually incorporated in the simulation. From an instructional standpoint, it is important to structure the simulation so as to afford players the opportunity to follow wrong strategies. Making errors is a highly effective way of learning. As Schild notes in an interesting discussion on the shaping of strategies, "The core of a game is to establish certain consequences (winning or losing) as contingent upon certain behavior (the play of the participant)."

What has become increasingly clear in education is that simply exposing students to correct solutions or decisions does not guarantee that those decisions or actions will be followed in a real-life context containing wrong decision possibilities. The player who has been exposed to a "wrong" strategy (and its consequences) will be better able to rule out that strategy when confronted with it later as a possible course of action. He still may not choose the best strategy, but he will at least be able to eliminate some poor strategies. It should be obvious that unless the simulation contains appropriate feedback mechanisms, the utility of having competing and differentially rewarding strategies will be largely lost.

A number of alternatives may be followed in Consumer, most of which are not very rewarding in terms of winning the game. First of all, a player is not under any circumstances required to borrow money. When faced with the need for funds to settle a negative chance card, he has the option of auctioning off some of his possessions to obtain the needed cash, even though this may not be wise. His monthly income is just sufficient over the period of the game to allow him to buy all items, particularly if he draws a "sale" chance card. In fact, there is no requirement that he buy any products. When borrowing money he is not required to shop around for the best rates or to evaluate the implications of borrowing on a six-month rather than a twelve-month basis. Nor is there any required buying sequence for those items he does purchase. However, because of the way the utility points and credit rates are structured, there is really one best course of action. The majority of adolescents and adults who play this game do not have insight into the best strategy at the outset and, for some, not even after one complete game session. Rather, their behaviors typically are governed by such extra-game predispositions as their attitudes toward the various financial institutions represented, their inclinations to defer gratification, or even how well they know each other. Occasionally a player will drop a wise buying strategy in order to imitate or follow the behavior of another player who he thinks may be wiser but who, in fact, is following an unwise buying policy.

In addition to those extra-game predispositions, there are other reasons why participants do not necessarily discern the best strategy in the game right off. Being unfamiliar with the social context of the simulation, a player may not realize that there is more than one possible course of action. Therefore, he may not look for alternatives, but simply choose the most salient solution. A consumer may not know that interest rates vary among credit agents and may therefore simply borrow from the most aggressive agent. When different courses of action are expected, they will not necessarily be equally obvious to all participants. Furthermore, even when different strategies are discernible as alternatives, it may be difficult for players to determine their probable consequences on an *a priori* basis. There is something to be said for making game strategies more obvious than they are in real life and for exaggerating somewhat their payoff differences.

An alternate approach is to allow for or facilitate the functioning of interpersonal processes whereby players exert pressures on each other to follow wrong strategies. (An example has already been mentioned with regard to imitative behavior in buying products.) Such pressures may be deliberately built into the game. The goals for players in different but interacting roles may motivate such behavior. For instance, the credit agent is motivated by his goal (to conclude as many transactions as he can) to induce consumers to borrow as frequently as possible and with as little thought as possible. Toward this end, credit agents in the game will sometimes suggest to their potential clients buying and borrowing strategies which work only to the credit agents' advantage. The absence of behavioral constraint rules which might curb this behavior is intentional. Our earlier example of the lack of prescribed do's and don't's with regard to the negotiating of contracts also bears upon this point.

TESTING THE GAME

Earlier discussion focused on the importance of feedback mechanisms in a game in order for participants to learn effectively from their experiences. Developing a social simulation is also an important learning experience for the designer, and the major feedback mechanism in this learning experience is the field testing of the game. The nature of the information provided the designer at this stage ranges from the theoretical soundness of the social model being used to the feasibility of various pieces of physical equipment. Since the main concern here is with the construction of educational rather than theoretical tools, we shall have to leave aside the very important problems involved in testing the basic theoretical model of the game and of using simulation games to develop social theory.

Consumer was tested among approximately twenty-five hundred persons prior to its first-edition printing. A number of factors influence the degree to which testing is undertaken. Generally, there is a positive relationship between the amount of testing required and the following factors:

1. The number of different roles in a game
2. The heterogeneity of the intended audience
3. The number of specific learning objectives
4. The complexity of the game model and role behaviors
5. The number of informal behaviors desired

The remainder of this paper will discuss some of these factors.

Variety of Roles

The number of different roles and number of players in identical roles may influence the number of game sessions required. Given the optimal number of players in a game session, the larger the number of different roles, the fewer the number of testing experiences obtained for each role per session. In Consumer the suggested number of consumers is twelve and one player for each of the other positions (bank, department store, finance company, salesman, and coordinator). Thus, in one game session, information is obtained about one role (consumer) from twelve different players while there are the experiences of only one player as source of feedback on the problems related to each of the other roles. As a result, more frequent testing was necessary to accumulate the necessary experiences with these roles. The role of consumer became operational more quickly than did some of the other roles. This is not to say that changes related to the consumer role were not made after it was first considered operational. Because consumers interact with players in all other roles, changes in rules and equipment related to these other positions often required some adjustment in consumer rules and record sheets. The effect of these changes on consumers had to be assessed continuously.

The Audience

The testing and operationalizing of the role structure cannot be done without regard to the particular kinds of players who will be assuming these roles. Players who differ in age, level of education, learning abilities, and other socio-economic dimensions bring different predispositions to the game. Social simulation games are unlike conventional role-playing techniques in which the actor is supposed to empathize with the social and psychological set normally associated with a particular role. Simulation games present a structure of that particular role within which the player may act out behaviors associated with that role without having to adopt the emotional qualities of that role. Because players are bringing in their own social and psychological traits and are not asked to drop them for a different collection of traits, special attention must be given to the task of structuring the simulation and its constituent roles so that it is relevant and workable for a heterogeneous audience. This requires that the structure of the various roles and the game in general be meaningful to a variety of persons.

An example will illustrate the problem of a heterogeneous audience. With regard to the adaptation of equipment, the use of dice as a means of introducing environmental responses into the game posed no problem among students from middle and upper class families. However, in testing the game among adolescents from economically depressed inner-city areas this aspect of the game was found particularly disruptive, expecially among female players. It became evident that this was due to the use of dice which had an unacceptable gambling connotation among these players. The problem was overcome by substituting chance cards for dice.

Instructional Objectives

The most important consideration in the testing process and the one to which all other aspects of the game being evaluated should be subordinated is simply this: Is the game teaching what it is intended to teach? How much a player learns from a game is probably a function of several things:

1. The visibility of alternative strategies
2. The salience of the consequences of pursuing good and bad strategies
3. The importance the participant places on the consequences of his strategies
4. The extent to which a participant perceives himself as able to control the outcome of the game
5. The level of participant involvement

The decision as to which of these (or the many other considerations which could have been listed) should be manipulated to increase the instructional efficiency of the game must be based on feedback that the designer receives from the test sessions.

There are at least three basic sources of information available to the designer concerning the instructional effectiveness of the simulation. The first is the response provided by students. In the early stages of testing Consumer this came entirely from post-game discussions. Prior to each session players were told about the general teaching objectives of the simulations. In addition, they were told that their comments would be very helpful, and they were asked to make note of any changes they felt would help improve the game. At the conclusion of the game the different strategies and experiences of the players were discussed along with their suggestions. These discussions of strategies and game experiences provided good indications as to whether the game was functioning as intended. It would be difficult to over-estimate the value of the suggestions received from players in this way.

Using the *same* students for different testing sessions is recommended in the early testing stages: first, there are fewer start-up costs in introducing and explaining the game. Also, the helpfulness of the participants' advice increases. Furthermore, the designer is able to know the players better and to this extent gain some additional insight into less obvious obstacles in the game. The case of the dice is an example of this latter point.

As the game becomes more refined on the basis of the post-game discussion, it becomes useful to administer a written questionnaire among persons playing the game for the first or second time. A word of caution is in order here: There is evidence that not all learning in a game, and perhaps not even the most important learning, can be adequately gauged through the use of a written questionnaire.

Another source of information is not solicited from players directly. It is generated during the course of a game session and is generally recorded by participants on their various playing forms. From these forms one can determine not only which activities were undertaken but also their sequence and frequency. In the Consumer game, without asking consumers, it is possible to determine, among other things, whether they purchased items in the most appropriate time period (or whether they were more likely to do so as the game progressed) and whom they borrowed from.

One can also simply eavesdrop on conversations between players. This practice may provide information on procedural elements of the game not readily understood, and it may provide insight into whether the nature of the exchange relationships between players is conducive to learning (e.g., are consumers asking about interest rates and contract terminology?). The use of tape recorders would seem to be an effective way of collecting this information in lieu of or in addition to the designer's or game administrator's listening in. Although this device was not used in the testing of Consumer, it appears in retrospect that the testing phase would have moved faster had this been done.

The third source of information is provided by game administrators. The originator of a device can usually guarantee its success so long as he directs its use. It may be quite another story when someone to whom the device is new must take charge of its administration. Unless persons who are unfamiliar with a simulation game are able to understand it and administer it without difficulty, the game will realize little of potential value for lack of use. It is important, then, that feedback be received from the teacher or administrator about his experiences with the simulation. After the designer has gathered sufficient information from the first two sources and made the necessary adjustment, his efforts should be devoted toward having persons unfamiliar with the game use and evaluate it.

CONCLUSION

It has been said that art is reality seen through a temperament. In many ways this is also descriptive of simulation games. The developer starts with the raw material of an idea and out of it creates a social situation consistent with his world view. Unfortunately, little attention has been devoted in the past to the multifaceted technical aspects of building social simulation games. It was the intention of this paper to specify the various processes and criteria which constitute the technique of simulation game building. Hopefully, because of an increased awareness of these techniques, more people will become involved in the building of these new educational tools.

B. Constructing a Simulation Game for Teaching: A Case in Economics for Elementary Social Studies*

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Donald A. Koeller
David S. Martin

This chapter reveals the partly anecdotal and partly analytical history of the development of two specific educational games for the fifth grade. The story, however, should be relevant to anyone who plans to design classroom games and should help the reader avoid some of the traps into which we occasionally fell.

The hypothesized mechanism by which a player learns from a simulation game is well characterized as follows:

> Each simulation is built around a theoretical *model*. The model makes it possible for the simulation participants to encounter "reality": they make decisions which are "fed into" the model, and the model produces "feedback" for the participants, outlining the consequences of their decisions. In each of several time periods, there are similar cycles of planning . . . deciding . . . putting the decisions into the model . . . receiving feedback from the model . . . and beginning a new cycle with planning, etc.

Thus a simulation game is a context in which a student can translate his own ideas or his verbal learning into overt actions and find out the consequences. The player makes decisions which get fed into the simulation; the simulation produces feedback as to the consequences of this decision. Over several cycles, by making use of the feedback and trying again, the participants gradually learn the most effective actions.

The Caribou Hunting Games are, in design, very close to the requirements of this theoretical model. In these games, the players, in the role of Netsilik Eskimo hunters, attempt to maximize the number of caribou they catch, by manipulating the variables under their control. Regardless of the amount of knowledge they have, few adults and no fifth graders (judging from pilot tests of the game) recognize and carry out the maximizing strategy on the first attempt. Rather, they must play the game by some strategy and see what the outcome is. With the insight from this experience they then must adjust the strategy (or choose one) and see how many more caribou they catch. By constantly utilizing the feedback from each completed game, a player can gradually master the strategy the Netsilik use in catching caribou.

The Caribou Hunting Games are somewhat unusual in that they are designed to be both true to the above theoretical model and an integral part of a larger curriculum unit. The games were designed to achieve certain

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specific objectives of the overall curriculum package. A description of the curriculum will clarify this relationship.

Education Development Center's elementary social studies curriculum, entitled "Man, a Course of Study," is designed to provoke children to investigate the question, "What is human about human beings?" The first section of the curriculum is entitled "Perspectives on Man and Animals" and approaches the general objective of identifying what makes men human by considering behavioral and morphological differences and similarities between man and certain other animals: the salmon, herring gull, and baboon.

In the second section the children are confronted with a classic case of the interaction of man and animals through a detailed study of the traditional Netsilik Eskimo culture of the Pelly Bay region in the Northwest Territory of Canada. The section is centered on life in the hunting camps of the people: the "inland camp" of the summer and fall when fish and caribou are hunted; and the "sea ice camps" of the winter and spring when seal are hunted. Each unit concentrates on the interaction of such diverse factors as technology, world-view, social organization, and physical environment in the effort of the people to hunt the animals successfully. The Netsilik are completely dependent on these animals for their food, clothing, tools, heat and shelter.

In terms of the differences between man and other animals the task of catching caribou can be conceptualized as follows: the caribou has a number of physical advantages over man, such as greater speed on land and a much keener sense of smell. On the other hand, man has a number of advantages over caribou: he can see much more clearly; he can plan and make changes in his behavior; he can make and use tools; and, by division of labor, he can cooperate with other men to accomplish goals which one man alone could not achieve. Since every family of four needs at least thirty-five caribou skins every year in order to survive, the Netsilik Eskimo man must use whatever attributes he has to overcome his physical limitations and catch the needed caribou. It is because the Netsilik interaction with the caribou is such a pure illustration of the differences between man and other animals that it was chosen as one focus for the second section of the course.

The Eskimo kills caribou in two ways: by using the bow and arrow, a tool which can kill at a distance and thus overcome the speed and nullify the sensory advantages of the caribou; and by driving the herd into a narrow "crossing place" in a lake, where hunters in kayaks can overtake the swimming herd and spear the caribou. In the latter case three important tools are used: the kayak, the spear, and the "inukshuk." An inukshuk is a pile of stones (a cairn) which to a caribou probably looks like a man. These, properly placed, frighten the caribou (much as scarecrows frighten birds) and help drive them into the water.

Bow and arrow hunting is simpler in conception but does not yield many caribou. Even if the hunters do manage, without frightening the herd, to get close enough to shoot one, the herd will flee as soon as one is killed. It is rare that a bow-and-arrow hunter has a chance to catch more than one in any herd. Although driving the herd into a lake (crossing-place hunting) is a more effective procedure, it requires considerably more planning and cooperation. Some hunters have to be concealed along with their kayaks near a crossing place, while others ("chasers" or "beaters") have to build inukshuks in strategic positions and then position themselves in just the right location so that by shouting and running toward the herd at the proper moment, they can drive it into the lake at the point where the hunters are waiting. There are two games in this section of the curriculum, one to simulate each of the kinds of hunting.

In the lessons leading up to the games the children study the attributes of men and caribou, study the tools available to man, and read an ethnographic account of the strategy of hunting with the bow and arrow. Then they play the Bow and Arrow Hunting Game. When they have finished playing several rounds of the game and have discussed the results, they see vivid films of an actual crossing-place hunt filmed in Pelly Bay. They draw pictures of this hunt, read about it, and even see a diagram of the strategy used in the film. At the end of these activities the children play the Crossing-Place Hunting Game.

Because the children are forced in the game to use ideas that they have already learned in a new and interrelated way, the designers coined the phrase "an integrative experience" to describe the role of the game experience in the curriculum unit. That is, the games should not add new knowledge so much as help solidify what is already "learned."

Originally there were four major objectives for the use of the Caribou Hunting Games in the curriculum:

1. To aid the student in distinguishing between the instinctual behavior of animals and the planning and decision-making processes of man.
2. To demonstrate how cultural adaptation had enhanced man's ability to survive and how this differs from morphological adaptation.
3. To illustrate the nature of Netsilik social organization. To show that cooperation is based on the need for survival rather than any high moral value attached to cooperation *per se*.
4. To familiarize students with the use of a symbol system of their own design and give them practice in manipulating it to communicate with other members of the class.

THE ORIGINAL VERSION

In this original form the games were played on a huge acetate-covered map, measuring nearly six feet by eight feet. This map was literally a reproduction to scale of the geographic details of an actual four-mile-square area of the Pelly Bay region of Canada. There were nine separate player roles in the game, and nine children were placed at various points around the huge map. Each child was given an Eskimo name and name-tag, and a one-paragraph description of his role in the hunting group, including his relationship to the other individuals played by the other students.

There were tokens representing each of the players and the caribou herd. The herd was moved by turning over cards in a deck, each of which had a prescribed move written on it (a certain number of squares marked on the board). By shuffling the cards the herd's exact path could be changed from game to game, although the deck was "stacked" to insure a general southerly movement to simulate the Fall migration. Players could move two spaces on one move and one on the next, simulating the ability to both run and walk; players had to choose the correct tool to use to kill the caribou; wind direction could change during the game according to a mounted spinning arrow; and once the Eskimo player tokens were separated by more than a few spaces, the players around the game board were not permitted to talk to each other, to simulate the inability to communicate at a distance. Instead, they were supposed to communicate by hand signals.

The early attempts to play this version of the game with fifth-graders were utter failures. (It had been designed by a commercial company with seemingly little experience in designing classroom devices.) The children could not pronounce their Eskimo names. Several of them could not read their profile cards, much less understand what they were supposed to do if they were told that they had a certain relationship (nephew, wife, father) to some other player in the game. The map was so large that there was no place to put it in a classroom; if placed atop seven desks, it still hung over the sides. It was so wide that many of the children could not reach the plastic tokens which represented their place on the map. In trying to reach the tokens, children often bunched up the map with their bodies, scattering the plastic tokens. The tokens all looked alike and many players forgot which were theirs. The tokens were too big to fit more than one on a square, and there was no rule governing what was supposed to happen if two players were on the same square. There were little lakes all over the map, and the important one at the bottom, where the caribou were supposed to be directed, became lost in the process. No one could keep track of which turn he could run (i.e., move two spaces) and which he could only walk. Certainly the teacher could not keep track of all nine of the players. The limitations on conversations across the gameboard effectively dampened motivation and strategy planning of any sort. However, when this restriction was removed, there still were too many children separated by too much distance for any group planning. At best, two or three children who were clustered at one end discussed strategies —who ought to do what—but usually in such a way that other children could not hear them. Many important rules did not exist; the hunter who caught the most caribou was the "winner," but the rules provided no way to catch more than one. It was not clear whether players could walk across the small lakes or whether they needed kayaks. And finally, there was only one gameboard for an entire class; the remaining eighteen students were supposed to sit quietly and watch the other nine play the game. Needless to say, they did not.

This early disaster drove us back to our learning objectives for the game, as, more than likely, many of the practical problems were the result of attempting to achieve conflicting objectives. While the objectives were not well-stated, several things became obvious in comparing the outcome of the field trials with the objectives.

Using hand signals across a few feet inside a classroom was too artificial. Not only did the students not develop a symbol system to communicate across the board, but the attempt to achieve this objective severely inhibited strategy discussion and planning. Attempting to simulate too much of the actual situation had caused the mechanism of the game to break down.

Knowledge of the social organization of the Netsilik could be achieved in the game only by memorizing the information on the role description cards which the students were supposed to read. Yet this knowledge was not related to anything in the game. There was no way in which a player was supposed to play differently because somebody else was his father or brother, and there was no pay-off in the game which would induce a player to learn the material.

Although the demonstration of cultural and morphological adaptation was a stated objective, it was not a part of the game. The behavior of both the men and the caribou was bound by the rules of the game. Changes in such behavior to simulate adaptation would involve changes in the basic rules of the game, and no such changes were permissible. A player could not try out various kinds of cultural or morphological adaptation and receive feedback from the system as to which was best.

The only objective which was even potentially in the game was the difference between instinctual behavior of animals and planning and decision-making by man; while the herd followed a predetermined program, the men could decide to change their direction at any time. But even in this dimension there was so little planning among the children and so many obstacles to such behavior that it could hardly have been expected that the game would teach this difference.

REVISION AND REVISION

After these early trials, the contract with the commercial game designing company was terminated, and the notion of using games in the curriculum was nearly dropped. However, the decision was made to redesign the games completely and try again. Eskimo names, profile cards, and the explicit playing of roles were eliminated. The map was reduced to the size of a desk top and mounted so it would not wrinkle. All the lakes except the one at the bottom were eliminated. Tokens were redesigned to look like inukshuks, beaters, and caribou. Movement was standardized: men moved one space per turn on land and two in kayaks; caribou moved two on land and one in water; a frightened herd fled three spaces. Each board had only three players: two were supposed to plan and discuss together as hunters; the third moved the herd. The herd was moved by a twelve-sided die marked with various compass directions, but men could move in any direction they wished. Wind direction was kept constant. Strategy considerations were now the only dimensions of the games: for Bow and Arrow Hunting, the proper starting places and the coordination of hunter movement; for Crossing-Place Hunting, the proper placement of inukshuks and beaters to drive the caribou into the water and the selection of the crossing place at which to put the kayaks and hunters. In Crossing-Place Hunting provision was made for determining how many caribou were killed by numbering the dots in the crossing place. The more toward the middle of the crossing place the kayaks intercepted the herd, the larger the number of caribou that were "killed." A rule was added which prevented the herd from entering the water at any place except a crossing place. If the die directed the herd into the water at some other place, the herd was to move along the edge of the lake until it either came to a crossing place or was directed by the die to move away from the water. Painted caribou tracks indicated the direction of the herd movement along the lake shore.

The physical apparatus for the first revision of the games was a peg board painted in various colors. The men and the caribou were represented by different colored pegs, and an inukshuk was made by piling three pegs on top of one another. This version was pilot-tested and at least was more playable, but there were still difficulties. Pegs were often moved inaccurately. Once a peg was moved it was hard to remember exactly where it had been, in case corrections were needed. The sense of smell of the caribou remained a part of the game, largely to justify the existence of wind direction as a factor, but with the pegs it was difficult to determine when the caribou were frightened by smell. Also, the lake shore was parallel to the bottom of the board.

The herd migrated in a south*westerly* direction; the beaters had the task of diverting the herd to the south to get it into a crossing place. This confused the children, who had learned that the herd migrated south. In addition, a cost-analysis determined that a peg board was much too expensive for large scale production and sale.

So the games were redesigned again. This time the board had a thick cardboard backing with a styrofoam interior that would hold pins. Beaters and hunters were signified by pins with a red flag on top; caribou by pins with a yellow flag. In one variation there was even a printed figure on each flag to show what the token represented. Inukshuks were made of three beads through which a pin could be stuck, and inukshuks could be built at the rate of one bead per turn. The lake was redrawn and placed diagonally across the southeast corner of the board. Now the herd migrated directly south, though still governed by the twelve-sided die. Footprints again directed the herd's movement along the lake shore.

At about this point it became apparent that the games we were developing had a very rapid cycle, so that one team could play the games a number of times in one or two class periods. The notion of recording the moves in one play of a game so they could be used for planning for a subsequent play and for later discussion began to seem vitally important. Then students could make deliberate use of the feedback from one play of a game to do better in the next. Consequently, in the pin-board version four students were placed at a board. One was the record keeper, recording on a smaller map-like version of the gameboard exactly where each person and the herd moved. This feature necessitated a coordinate system (letters on the horizontal, numbers on the vertical) which was added to the edge of the gameboard and the record sheet.

An eight-classroom test of the pinboard version of the game uncovered serious problems. The little plastic balls which were to be skewered by a pin to make an inukshuk kept getting loose, falling on the floor, and rolling everywhere. The board material was difficult to penetrate with a pin. The colored flags fell off the pins. Some children delighted in jabbing each other with the pins! A plastic overlay scent indicator, to indicate when a herd was frightened by human scent, had been developed because children had continually misunderstood this rule, but it could not be used with pins sticking out of the board. The role of record keeper was boring as well as extremely difficult, since the children could not accurately transfer the location of Eskimo and caribou moves to the small record sheet.

The next version used a gameboard made of a pad of throw-away paper sheets on which children marked their moves with felt-tip pens, using different colors to distinguish the hunters or beaters from the caribou and a symbol to represent an inukshuk. Since this method provided an automatic record of actions during a game, the fourth player at a gameboard could be eliminated. The twelve-sided die had proved too expensive to produce, and it was replaced with two six-sided dice.

Still, pilot tests uncovered more problems. The relative rate of movement between man and caribou had to be adjusted. The proper starting point for the herd had to be determined. The best distance for the herd to "flee" was changed. A rule was adopted to permit players to place their inukshuks *before* the game began, rather than having to build them during the game in order to simulate more closely advance planning. Finally the game was ready.

In the Spring of 1968 the games were tested in over twenty classes, with systematic observation, interviewing, and pre- and post-tests. It was concluded that the game activities were both workable and educationally valuable. There was clear evidence that the students learned a great deal from playing the games and that what they learned fit the objectives for the course.

Some problems remained. The rules on the direction of flight of a frightened herd turned out to be too complicated. The analysis of the used game sheets identified numerous cases of students mis-using the rules. Since both games were played on the same gamesheet, children often asked about those portions of the game map that pertained only to the Crossing-Place game while they were being introduced to the Bow and Arrow version. The use of a film strip to present the rules made it difficult to introduce the games to a small group within the classroom. The film strip also made it difficult to go back over the basic rules if students were unsure, and the mimeographed rule sheets stating the rules verbally were of little or no help to fifth graders. There was also some concern about the expense involved if the teacher was liberal in the number of game maps used. Still, the games had functioned quite effectively in their existing condition and there was disagreement on the need for and the wisdom of further revision.

The impetus for yet another revision came from some very disappointing experiences in an inner-city school. The games were unplayable, apparently because of the complex nature of some of the rules and because of the long time involved in the initial "rule session." It seemed that for the games to be usable everywhere, they should be even simpler for their first playing, with complications to be introduced through instructions to the teacher if the students had no trouble with the initial version.

A new version was then planned that would use inexpensive 8½" × 11" ditto maps, one style for each game, simplify the more complex rules, and introduce a separate rule booklet for each student with a diagram illustrating each rule. Each of these changes was pilot-tested in both suburban and city schools.

The use of separate maps for each version of the game eliminated all of the problems previously encountered when children would ask about those portions of the map that pertained only to the Crossing-Place game when they were learning Bow and Arrow, making it much easier to introduce the first game and then to follow the logical sequence of the whole unit. The smaller maps were easy to handle; shortened the game time, and created no special problems (although they were less attractive, due to their small size and inexpensive design). But the cost had been reduced; teachers would not hesitate to let the children play as long as more maps could be run off on the ditto.

The use of a smaller map suggested the first simplification in the rules. The rule that determined when contact was made with the herd, both for frightening or for killing, was changed from being on the dot "adjacent" to the herd to being on the same dot. This eliminated the need for clarifying the meaning of the word "adjacent" and reduced the number of possible contact situations from over forty to thirteen. It was then possible to group these and illustrate the direction of flight for each possible condition of contact. Furthermore, the new rule limited the directions of flight to either east or west (not all eight compass points as before). This was much simpler and also reduced the chance that the herd would retrace its path on the next move. The use of the rule regarding wind direction and the ability of the caribou to smell the hunter was dropped from the basic game entirely and added to a brief list of suggested optional variations.

The rules were placed on two 8½" × 11" manila cards, one for each game. They were grouped both according to the logical sequence of play and in columns appropriate to each of the players. The text was kept at an absolute minimum, and each group of rules had an example drawn out on a small section of the game map. The students' attentiveness to the initial presentation was not as complete as it had been with the film strip, probably in part due to the fact that each child could be involved with any of the rules at any time, rather than just the one being presented on the screen. But if a teacher quickly covered the basic rules, relying on the reference value of the rule sheet, the game could get underway in half the time previously required. Student use of the new rule sheet during the game play has been high; and the new form provides the opportunity for teachers to deal with the more complicated rules in small groups as the problems are encountered, rather than having to deal with all contingencies at the outset.

The final version involves two pads of highly stylized printed paper sheets, three crayons of two different colors (one color for caribou, one for hunters), and a pair of dice. Each game is played by three children. In Bow and Arrow Hunting two play the hunters while the third rolls the dice, moves the herd, and acts as referee. In Crossing-Place Hunting two children play the two beaters while the herd is on land, then switch and play hunters in kayaks after the herd enters the water. Again, the third child moves the herd and referees. After each cycle of each game the children rotate roles. The games are played on similar, but not identical game sheets, and many of the rules are the same for each. The more complex Crossing-Place game simply involves the addition of rules to handle kayaks, inukshuks, and herd behavior in or near the water.

The game is designed so that there is one best strategy, which is directly analogous to the one the Netsilik use, and the payoffs in the game are roughly proportional to the quality of the strategy the players use. In an effort to teach or integrate knowledge of the "pattern" of the Netsilik interaction with their environment, it was assumed that the most effective approach was to demonstrate that, given the contingencies of their environment, the pattern the Netsilik use works best. In spite of the fact that the children have seen that strategy on paper and film before ever playing the games, it is interesting that almost all children have to "rediscover" that strategy after some trial and error within the operational framework of the game situation.

ADMINISTRATIVE PROBLEMS

The problem of training teachers to use the Caribou Games was multidimensional. For many teachers the Caribou Games were the first exposure to *any* classroom game. The initial reaction was anxiety—anxiety at having to help children use a piece of material which had rather complex procedures. We found this was best relieved by involving the teachers in playing the games. Once they had mastered the games at the adult level and discussed the issues raised by the games on that level, their anxiety subsided.

A second dimension of the teacher-training problem was the teacher's feeling that somehow the unified authority of the classroom would no longer be in his hands. This feeling seemed rooted in the unusual noise level of children participating actively in the games, often for an hour at a time and the fact that children were working in small groups in interaction with ***each other*** rather than interacting with and through the ***teacher***. This problem was best overcome when teachers saw the enthusiasm and involvement of children playing the games in a classroom. Virtually all liked what they saw.

A third problem was procedural. For the first time in many classrooms the teacher had to consider moving classroom furniture somewhat radically. He had to consider optimum combinations of pupils—should children be grouped by sex, by emotional stability, by intelligence, by achievement in reading, by friendships, at random, by their own choice, or some other way? We tried to gather some data to aid the teacher in making this decision, but to determine optimal groupings for the games remains a long-range research question.

A final dimension of the teacher-training problem involved the best way to capitalize on the game experience. As with many classroom games, children playing these games tend to become involved in the games *per se*. The teacher must see to it that the game experience generalizes to other aspects of the course. He must be capable of making creative use of the increased imagery and associated experiences of the games while remaining faithful to the general framework of the course of study. We were able to provide questions and guidelines for a follow-up discussion, but what seemed to be the best technique—moving from playing group to playing group seeking particular events which could be used to make the follow-up relevant to the game experiences of the children—could not be written into a lesson plan. At the very least, we are convinced that for teachers to use games effectively, there must be simultaneous teacher in-service workshops or seminars, particularly for those who are using games for the first time.

A GENERAL VIEW

The development and testing of the Caribou Games took more than two years, numerous classroom tests both large and small, and a substantial portion of the time of four people: two teachers on the staff, an evaluator, and a designer. Many other people were involved from time to time. The overall trend was clearly one of increasing simplification. Every time a difficulty was uncovered, some way was found to eliminate the problem, usually by removing some features from the games.

On the basis of our experience with the Caribou Hunting Games, we wish to suggest the following principles for designing educational simulation games.

1. A game must be designed so that learning how to play (the rules, the variables, the permissible actions) is fast and simple. Then the players can concentrate on playing better.
2. A game must be designed so that the actions of a previously completed game are recorded and available for study. This record becomes the feedback for correcting and improving subsequent play.
3. The particular causal relationships between a strategy and an outcome must be clearly identifiable, so the player can determine what aspect of a particular strategy was inadequate.
4. The degree of success in a game (the feedback) must be directly related to the quality of the strategy employed.
5. A game must be designed so that any individual can play the game numerous times. Only then can he gradually improve his play. What-

ever the time constraints of the normal use of the game, it must be possible to play the game several times within that time constraint.

6. A game must be designed to encourage players to experiment actively with different strategies. It must discourage players from sticking with the same strategy play after play.
7. A game must be designed so that every player can play every different role several times to gain the insights of that role. In order to do this, the number of different roles must be kept to a minimum.

The course makes ample use of other media: films, filmstrips, records, and sort-cards. Yet as a medium for instruction the games have several unique properties. They are able to engage students directly in an interactive process in such a way that the students have some control over the outcome of the process. No matter how exciting or realistic the films, records, or filmstrips are, they remain essentially things which students observe. While they can be stopped or started, while students can vicariously participate in the action by identifying with the actors, while children can *discuss* the nature of the medium (why the photographer chose this camera angle, why this time of day) the children cannot actively take part in and control the action. They cannot (at least the way the course is designed) try making their own version of a film and see which created the more powerful image—their own or the one they were given. For all their power, the other media remain essentially linear in their action, and the action remains outside the control of the students.

In games children are part of an on-going process, what they do affects the outcome of the game, and they can directly experiment with the nature of the medium by changing the strategies they use or the rules of the game to see which approach works best. The essence of the games' contribution to the curriculum is that for the first time the children have to take the factors they have studied independently, as static entities, and deal with them as parts of a process. They must simultaneously manipulate and coordinate the variables, over a period of time and under the tension and excitement of the game, to "catch the caribou."

C. Selecting a Simulation Game for Teaching: Questions and Criteria*

Judith A. Gillespie

People often use games for a variety of different purposes. A child can transform a few blocks into houses, cars, or stick figures and build a community. He can then model the behavior of adults at work and explore community life. Piaget has demonstrated that with a few marbles and fewer rules,

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children can explore some basic aspects of social interaction. Children relay heavily on imagination to construct their games, yet these games often provide important insights into the real world.

Children, however, seldom develop games about a whole range of serious scholarly topics. Rarely does a child's game explore the reasons for the outbreak of war or the politics of legislative logrolling. Serious games are of a basically different sort. They rely much more on knowledge than on imagination. A serious game is constructed out of a wide range of research and scholarship on a topic. It is based on principles or theories which provide players with explanations of dimensions of human behavior, mathematics, or ecology. These principles or theories constitute the knowledge base for a game.

Building a sound knowledge base for a serious game does not mean that the game need be more complex. Some of the most serious scientific investigations have been based on very simple game-like constructions. With a point, a line, and four rules (postulates) Euclid discovered the basis for geometry as it is taught in schools today. With two symbols, X and Y, and some basic rules of division, Mendel created the basic knowledge for the science of genetic evolution. Thus serious games, like children's games, can convey a great deal of knowledge from very simple constructions.

Classroom games are a mix between imaginary situations similar to those children so easily and naturally create and serious scientific explorations. They are designed to provide a sound knowledge base for learning and at the same time take advantage of children's imagination. Like the game of marbles and the science of geometry, classroom games are based on simple elements: choices, moves, and rules. The way in which these three elements are put together largely determines what students will learn from playing games and whether they will enjoy them.

The choices, moves, and rules which form the basic structure for games can be evaluated in many ways. The question can be asked: "Are they interesting?" Many games are based on exciting choices such as crisis decisions in national and international politics or decisions about life chances in ghetto situations. Many games also offer interesting moves or activities for players such as controlling large corporations or participating in election campaigns. However, most teachers would not be satisfied with a game that only offered students "involvement" and excitement.

A second question can be asked: "Is the game workable in a classroom situation?" Many games structure choices and activities for a classroom environment. Fewer of these games are accompanied by clear instructions and a manageable number of materials. However, again few teachers would be satisfied with a game that was merely "workable."

Most teachers expect a game to serve some instructional purpose so that students can learn something useful and important from playing. The first two questions are important for the teacher, yet without some reasonable answer to the question, "Does the game have a sound knowledge base?" he has relatively little assurance that the game can effectively contribute to student learning. Very few games actually make this kind of contribution. The choices available to students can be unclear, the activities unstructured, and the rules inconsistent. Often the game is so complex that students cannot determine major influences on their behavior. Because games are subject to these weaknesses, the teacher needs a means for analyzing and evaluating classroom games that will give him reasonable assurance that a game will make a sound contribution to student learning.

Accordingly, choices, moves, and rules will be analyzed here in terms of the knowledge base they create for learning. Six questions through which the teacher can identify the knowledge base of the game are posed: (1) What is the central problem presented in the game? (2) What choices are available to players? (3) What are the different moves or activities provided for players? (4) What are the rules for the game? (5) How is the game organized? and (6) What summary activities conclude the game? Criteria will be developed for each question in order to enable the teacher to distinguish sound from dysfunctional answers. For each question and criterion, various practical applications to games will serve as illustrations. In this way the teacher will be provided with a means for choosing among available games those that have the maximum potential for classroom learning.

Questions and Criteria: An Overview

In a sense, games form a type of snapshot picture of some feature of human behavior. They cannot give a complete view of everything included in a life situation, but they can picture a small fragment accurately. The accuracy of the picture is determined by the whole image that it projects. Just as someone would not judge a snapshot's quality totally by the facial expression of a person photographed, a teacher cannot judge a game by looking only at one component.

Therefore, the six questions about the game are not much help to the teacher singly, but together they provide an accurate picture of the knowledge base of a game. A knowledge base is built upon a problem statement (Question #1). From that statement the essential concepts and principles are transformed into choices, moves, and rules in game play (Questions #2-4). The choices and moves are organized in a way that effectively or ineffectively guides players to learn about the basic concepts and principles (Question #5). The summary activities of a game determine whether or not the game can achieve its purpose in the final outcome (Question #6). Therefore, each question is tied to an important part of the knowledge base of a game. Figure 1 demonstrates this relationship as follows:

FIGURE 1: The Relationship Between Questions and Parts of a Game

Questions	*Parts of a Game*
1. What is the central problem presented in the game?	Problem
2. What choices are available to players?	Choices
3. What are the different moves or activities provided for players?	Moves
4. What are the rules for the game?	Rules
5. How is the game organized?	Organization
6. What summary activities conclude the game?	Conclusion

If the questions are taken together, they provide the teacher with a means for identifying the key aspects of the game as a whole.

Once the teacher has identified significant parts of the game, he needs to have on hand some useful criteria for evaluation. The criteria should serve two purposes for the teacher: (1) they should enable him to distinguish sound from dysfunctional parts of a game, and (2) they should promote a judgment of the total acceptability of the game. In order to accomplish these purposes, criteria need to be developed for each part of the game and for the relationships between parts.

Three criteria are developed for evaluation of the central problem of a game: clarity, conceptual content, and utility. Since the problem is the cornerstone on which the remainder of the game is based, a clear, conceptually rich problem statement will ensure that the game is more than a collection of activities without a sound foundation in key concepts and principles. A problem statement which gives direction about the use which will be made of the game ensures that the concepts and principles will serve a purpose, such as developing a skill or knowledge, which fits the teacher's objectives. If the problem statement meets these criteria, the teacher will have maximum assurance that the game is based on an insightful view of a real-world problem situation and that it can be useful in his classroom.

The choices, moves, and rules that are developed from the problem statement can be evaluated according to the criteria of soundness, consistency, and lack of distortion. To be sound, choices must be carefully grounded in the problem statement of a game. The activities or moves need to present an ordered, consistent sequence of behavior as the result of meaningful decisions. In addition, the rules of the game need to provide undistorted guidelines for behavior which lead players to make sound decisions and act consistently. If the components meet these three criteria, the teacher can make a well-reasoned decision about what students will learn from participating in game play.

The effectiveness of the way activities are organized in the game can be determined by two criteria: inclusiveness and sequencing. If the players are organized such that only a certain group makes the essential choices in the game, then very few students will really be exposed to the "learning by doing" payoffs of the game. If the activities are sequenced such that students do not have time or opportunity to consider the major learning aspects of the game, then the teacher has very little assurance that the students will learn from game play. Accordingly, the inclusiveness and sequencing criteria give the teacher a basis for judging whether students have adequate opportunity to learn through participation in the game.

Summary activities are designed to bring out what students have learned during game play. The summary needs to be adequately related to the problem statement and the activities in the game as well as to provide some application lesson for students. If the game does not provide adequate summary or application activities, the teacher cannot be assured that the final outcomes of the game will be learning outcomes for students.

The relationship between questions and criteria can be summarized as follows:

FIGURE 2: Questions and Criteria

Questions	*Parts of a Game*	*Criteria*
1. What is the central problem presented in the game?	Problem	Clarity Conceptual content Utility Relationship to real-world

2. What choices are available to players?	Choices	Soundness
3. What are the different moves or activities provided for players?	Moves	Consistency
4. What are the rules for the game?	Rules	Lack of distortion
		Relationship to problem
5. How is the game organized?	Organization	Inclusiveness Sequencing Relationship to choices, moves, rules
6. What summary activities conclude the game?	Conclusion	Adequacy Applicability Relationship to problem Relationship to activities

The figure demonstrates how the knowledge base of the game can be evaluated by this set of criteria. The criteria determine the quality of each component of the game and the relationship between components. In this way the questions and criteria provide the teacher with a means of determining the soundness of the picture of the world that the game creates.

In order to demonstrate how the questions and criteria can be practically applied, several concrete examples of games will be developed. One game in particular will be introduced in order to serve as a concrete example of some sound ways in which an ideal game fits the criteria. The game in finished form would contain a full range of kaleidoscopic materials that a normal game does. It is a simulation about voting behavior in which students take on roles of voters and candidates, attend rallies and run a newspaper, and vote on election day. There are ballots and public opinion polls, money exchanges, and radio broadcasts. In short, the game is typical of simulations of its kind, complex and full of activity. The game can be outlined briefly as follows:

Problem:	On what basis do people decide to vote?
Objectives:	1. Students can determine a general relationship between party identification and voting behavior. 2. Students can determine how issue position and candidate appeal influence voters in making decisions about voting. 3. Students can determine the conditions under which a voter switches parties in voting.
Game Play:	Students act out roles as voters, group leaders, candidates. Students participate in party meetings, group bargaining sessions, campaign rallies, and voting. Students make choices among party loyalties, issue positions, and candidate appeals.

Game Rules: E.g., students cannot base their vote totally upon one factor in the election if it conflicts with traditional party loyalty.
Organization: Number of players can range from 4-48. Total time is 4-5 class periods.
Summary Activities: Students answer questions about the relationship between party identification, issue position, and candidate appeal.
Students apply their findings to the most recent U.S. election.

The essential parts of the ideal game are developed in this outline. Other games of various kinds will serve as counter examples in order to illustrate how the criteria discriminate between less well-developed games. Taking both the ideal game and the counter examples into consideration, the usefulness of the questions and criteria posed earlier can be demonstrated through practical examples.

Question #1: What is the central problem presented in the game?

To begin to answer this question, the teacher needs to surface a problem statement from a game. He does this by examining the background information and the educational objectives stated in the teacher's guide, and advertisement, or information from another teacher. Problem statements are not usually developed in the form, "the problem of the game is . . . ," but by reading the background information and objectives the teacher should be able to learn what the central problems of the game are. He then begins to apply his criteria of clarity, conceptual content, and utility to the background information and objectives.

The clarity of a problem statement is important to the teacher's evaluation of a game. Suppose that the teacher is giving a course in American Government which covers the topic of voting behavior. He desires to determine whether the hypothetical game on voting behavior introduced previously will serve his purposes. If he finds in the general description of the game a statement such as, "the purpose of the game is to study about voting," he would know very little about the content or use of the game. The problem is too vague. It does not indicate the kind of voting (legislative, electoral) or the nature of the study (voting procedures, voting decisions).

A clearly-defined problem statement gives the teacher a great deal of information about a game. For example, a game that is based on voting behavior can have several kinds of well-defined problem statements. One problem statement could take the form: What is the process through which people vote in national elections? The problem statement indicates that the game will be utilized to develop a skill: how to vote in elections. The major concepts will include registration, primaries, and balloting. A second problem statement could take the form of the ideal voting game outlined previously: On what basis do people decide to vote in national elections? This problem statement indicates that the game will be utilized to present a body of knowledge—what is involved in a citizen's decision to vote. The game will center around such concepts as party identification, issue salience, and candidate appeal. Thus a problem statement conveys to the teacher both the essential conceptual content and the use that can be made of the game.

If the problem statement is accompanied by a set of educational objectives, the teacher can be more certain of his evaluation of content and utility.

Again, with a voting game, a set of objectives might be constructed as follows:

1. Students can participate in a simulated election campaign.
2. Students can learn how to conduct rallies, campaign for candidates, and vote.
3. Students can learn about role behavior of voters and candidates.

These objectives tell the teacher very little about the substantive content or use of the game. He knows that students are going to enter into activities, but he has no way of determining what they will achieve in terms of learning in the game.

A set of objectives which will give the teacher insight into what the game is about and how it can be used might be presented as follows:

1. Students can determine a general relationship between party identification and voting behavior.
2. Students can determine how issue position and candidate appeal influence voters in making decisions about voting.
3. Students can determine the conditions under which a voter switches parties in voting.

These objectives outline the major concepts of party identification, issue position, and candidate appeal. The use of these concepts in the game is also clear. Students will be encouraged to learn about a body of knowledge focusing on voting behavior, not how to vote or who are the candidates in the most recent campaign.

From a clear problem surfaced by analysis of the introduction and educational objectives, the teacher can evaluate whether a game is realistic and useful for the classroom. The degree of realism in a game is determined by a comparison of the problem statement with what is known about the real-world situation. Suppose that the teacher is evaluating a game about international conflict and the essential concepts are war and trade relations. The teacher could easily see that a game on international conflict needed to include the concept of negotiation or diplomacy in order to accurately represent an inter-nation conflict situation. Otherwise the militaristic and economic aspects of conflict are over-emphasized. The purpose of the game is not realistic according to the teacher's evaluation because it does not accurately represent the real-world problem situation. A game will never include *all* the necessary concepts to completely identify a real-world situation, but a teacher must be sure that it contains the essential ones. Otherwise students learn an exaggerated or wrong image of the problem situation.

In contrast, the voting game which has as its essential concepts party identification, issue position, and candidate appeal does represent accurately a real-world situation. There are many concepts which are omitted such as media influence or status, but the game does not distort the students' perceptions of the real-world voting situation. According to what is known about voter behavior, the three concepts represent the major forces generally influencing voting decisions.

The teacher can also begin to evaluate the utility of a game based on a clear problem statement. If the teacher wanted to teach students about the basis for citizens' decisions to vote, then the ideal voting game would serve his objectives. However, if the teacher wanted to teach students the process of voting, e.g., how to register, then the game would not serve his purpose. If the game did not state clearly the purpose for which it would be used, then the teacher would be at a loss to determine what the game intended to teach.

Thus the problem statement determined by background information and educational objectives validates the purpose of the game for a teacher. Having made initial judgments about clarity, conceptual content, and utility of the game, the teacher can be sure that the game is fundamentally sound and useful in his classroom. To the extent that the problem statement fails to meet these criteria, the teacher gambles on whether the game accurately represents what he wants students to learn and whether the game will serve the purpose he intends for his class.

Question #2: What choices are available to players?

It is impossible to determine all possible choices that a player could make in even a relatively simple game. In the case of Tic-Tac-Toe, for example, players face 15,120 possible choices of moves by the fifth turn. However, it is relatively easy to determine what *types* of major moves a game contains. For example, in Tic-Tac-Toe, a player makes only two types of choices for any of his 15,120 possible: he can attempt to make 3 X's in a row, or he can block his opponent from making 3 O's in a row. The types of choices, then, will give the teacher a basis for determining the decisional base for the game.

For any given game, the teacher determines the choices that are made by analyzing the major points in the game which change player behavior. In a board game, the teacher looks at how game play is presented and pulls out the major (at most a half-dozen) situations in which players make different types of decisions. It can be a new level the player attains or a new resource he has obtained from a previous turn. In the case of Tic-Tac-Toe there is one type of decision with two alternatives for choice. However, in the case of *Monopoly* there are two types of decisions, one to buy new property or risk paying rent to an opponent on the next round and another to add to holdings after the player "owns" a square. In a simulation, the teacher can just as easily determine the major choices by examining individual roles and group activities. In the voting game, for example, the major activities are party meetings, group meetings, rallies, and voting. By examining these activities, the teacher can determine that party meetings are organized around a decision about party loyalty, group meetings are designed to promote given interests on issues, and rallies focus on candidate appeal. Thus the major types of choices in the game are of these kinds.

Once these types of choices are outlined, the teacher can determine whether the choices are sound. The "soundness" of choices is determined by comparing the problem statement and the major choices in the game. Essentially, the choices should capture the full range of each of the major concepts in the game. For example, a game concerned with ghetto poverty whose major concepts include housing quality, educational disadvantages, and lack of semi-skilled job opportunities would not offer "sound" choices if players' moves in the game were determined totally by increases in employment opportunities or, worse yet, totally by chance. Even though the problem statement was clear and rich in conceptual content, the choices would be unsound because players would never be faced with situations involving the essential concepts of the game.

The voting game can serve as an example of a series of sound choices. Corresponding to each major concept—party identification, issue position, candidate appeal—there is an activity in which players participate—party meetings, group bargaining sessions, rallies. In each activity, players make a choice about one or more of the concepts such as whether to remain loyal to a traditional party or switch. The choices are simplified, but accurate, representations of the voting problem posed by the game. One choice is not emphasized out of proportion to others, nor is any major concept in the problem omitted.

In general, then, the teacher identifies the choices in a game by analyzing the major decision situations in the game—turns or activities—and determining the different *types* of choices involved. He then evaluates these choices based on a comparison between the concepts delineated in the problem statement, seeking to determine whether or not the alternatives offered in the game adequately involve these concepts. This is an important determination of the soundness of the knowledge base for a game, for it tells the teacher that students will be involved in making decisions which accurately represent all dimensions of a problem statement.

Question #3: What are the different moves or activities provided for players?

When an outside observer looks through the classroom door at a game, his immediate reaction is often "What chaos!" He may see students dispersed around the room participating in seemingly unrelated activities. He may also see students in groups moving pieces on a board in what seems to be mere entertainment. Actually, in a well-constructed game these apparently unrelated activities are all parts of some important game strategy.

The basic strategies in a game are most easily determined after the essential choices have been examined. Once the teacher has identified the *types* of choices in a game, he then determines which choices precede others. For example, in *Monopoly* the decision to own a square occurs before the decision to add to holdings. He then proceeds to link choices together by examining alternative sets of choices. For example, if a player chooses to own a square in *Monopoly*, his next choice can be to add houses. If a player chooses not to own one square, his next choice may be to own another square. As the players move from their first to their second choices, they progress toward an outcome. Outcomes can be defined as winning or losing, as well as achievement of a particular kind of goal which is not measured directly as a "win" or a "loss." A set of choices, moves, and outcomes determines a strategy.

The voting game can serve as an example of analyzing choices and moves. The major choices in the game concern party identification, issue position, and candidate appeal. The sequence of choices is determined by the order of activities: First, students attend party meetings to make some choice about party identification. Second, students attend interest group meetings to argue issues. Third, students attend campaign rallies to make a decision on candidate appeal. The situation is considerably simplified, yet an accurate way of representing real-world choices. The alternatives of each choice are Democrat or Republican. Having identified the major choices and their sequence, the teacher would then determine which set of choices led to "winning" outcomes and which led to "losing" outcomes. He would then have generally identified each of the important strategies or sets of moves in the game.

Once the teacher has identified the major strategies in the game by analyzing the sequencing of choices and the outcomes, he can begin to evaluate the degree of consistency in each strategy. The teacher primarily wants to make sure that winning strategies do not involve inconsistent choices or moves and that one losing strategy is not emphasized over a winning one.

The import of this type of evaluation cannot be underestimated. The teacher uses a game and the students play it in order to learn something about the central problem of the game. If players are forced to make inconsistent moves in order to win, they will not learn from their behavior in the game. If they are forced to lose because that strategy is most available, they will not profit in the gaming situation from "learning by doing."

Therefore, "consistency" is determined by judging whether the major strategies in the game involve contradictory choices or moves. For example, in an economics game concerning money expenditures, winning could be defined as making the most money. The choices involved in a "winning" strategy might include both stock market speculation and investment. If a player had to invest to win the game and every time he invested he was driven into bankruptcy, then the player would lose by a winning strategy—an outcome from which he would learn very little. However, in the voting game, party identification is the strongest factor determining the vote. To win by voting against his traditional party loyalty, a player must have a very strong vested interest in issues and candidates of the opposite party. Therefore, if a player decided to vote Democratic based on a Republican party identification and a weak issue position, he would lose and thereby understand the import of party identification.

Consistency, then, is a fundamental requirement for the strategies in any game. If the teacher is unable to identify the major strategies and evaluate their consistency from a review of the gaming materials, he can be sure that the knowledge base of the game is not well-developed. The strategies in the game are key to the learning experience a game provides. The degree to which a game meets the consistency criterion determines to a large extent whether the game involves learning which is both sound and rational.

Question #4: What are the rules for the game?

Rules function in games much as they do in any other context. The largest deviation in the gaming situation is that one significant rule in the game is often the operation of chance. Rules of chance can determine everything from who goes first to which strategies are followed by players. Any rule, chance or otherwise, is used in a game to set limits on the choices and moves available to players. They are also often used to direct players to winning outcomes. The central evaluation question for the teacher is whether or not the limits set by rules distort the gaming situation.

It's very easy to determine the rules in a game; most are listed in the gaming material. However, it is more difficult to determine the effect of a particular rule on game play. They are often many in number, highly interrelated, and only implicit in game play. A rule of thumb for the teacher is to look first at the major mechanism which begins the first few turns of play—dice, rotation, a simulated conflict—then to turn to these rules which guide the major strategies, and finally to look at the termination rule or how the game ends.

The major criterion guiding the evaluation of rules is lack of distortion. Distortion commonly occurs when a rule overemphasizes a losing strategy. For example, if an international relations game focuses on conflict, the key choices could involve the concepts of war, negotiation, disarmament, and economic security. Rules which made it very easy to go to war and extremely difficult to negotiate would distort the major strategies of the game out of proportion to the problem situation. Rules must, however, be evaluated in totality, for if the rule which facilitated war was balanced by a rule promoting negotiation, the game would not sacrifice one strategy for another.

An example of misusing the rule of chance is an electoral college game. The problem of the game is to determine how candidates gain electoral votes. The major concept is votes per state, and the major rule for determining states won is the correct answers to random questions about the three branches of government. In this case chance can be effectively used as a rule for determining which questions students must answer, but unfortunately chance also determines which *states* are gained by candidates. In this way, the Democrats can sweep the Midwest and the Republicans the South without any problem. Thus, the chance rule completely distorts the strategic aspects of election campaigning.

Rules are used effectively when they do not distort strategies or outcomes. In the voting game, for example, one of the rules listed is that voters cannot vote based on candidate appeal alone if the candidate conflicts with both a strong traditional party loyalty and a strong opposing issue position. This limits the choices of voters, but it does not distort the major strategy in the game—to find the most consistent base for voting in an election. Used effectively, rules can aid players in achieving winning outcomes and limit the complexity of the game so that students have a better chance of learning from their moves.

If the choices, moves, and rules of a game are sound, the teacher needs to make one final evaluation. He needs to compare these components as a whole to the problem statement in order to make sure that the major strategies and outcomes of the game are consistent with the problem situation. To do this the teacher evaluates the strategies in terms of the degree to which they promote explanations of the problem situation. If a winning strategy maximizes the problem situation and a losing strategy minimizes it, the two parts are consistent.

For example, the winning strategy in the voting game is to vote based on a consistent party identification, issue position, and candidate appeal. In the real-world voting situation in national U.S. elections this is a maximum position for any citizen. As the contradiction in these variables increases, the citizen is less and less likely to vote at all, much less have a rational decisional base for voting. However, if the voting game were to attribute a winning situation to abstention when the three variables consistently favored voting for one party, the game would not accurately represent the problem of voting for most citizens.

Question #5: How is the game organized?

There are two organizational dimensions of a game that are particularly important for evaluation: the organization of players and the organization of activities. The organization of players determines *who* participates in any given activity in a game. The organization of activities determines *how* players participate.

The organization of players can most often be identified by the initial breakdown into groups of a board game and the role descriptions in a simulation. The organization of activities is classified by the moves in a board game and the group interactions scheduled in the day-by-day activities of a simulation. Once the teacher has identified these elements, he can begin to evaluate them according to the criteria of inclusiveness, sequencing, and relationship to the choices, moves, and rules in the game.

The organization of players is important to the success of a game in two respects. First, choices change considerably as the number of players in the game varies. Choices made by teams require organization that choices of individual players do not. For example, in the case of a board game with partners, the increase from four to six players can change the moves in the game from straight competition to coalition formation. The problem for the teacher is to determine whether or not the types of choices remain the same over different class sizes. He can apply the criterion of inclusiveness by first determining the least number of players that can possibly play the game, then the highest number of players that can possibly play the game, and finally the number that will be participating in his class. If, for example, the voting game is constructed for 35 players and the teacher has a class of 20, the teacher should determine whether or not the outcomes of the game are the same. If he eliminates 15 Democrats, can the Democrats win the election? If he eliminates 10 Republicans, will the Republican party meeting have any meaning?

The organization of players is equally important in a second respect. The teacher not only wants the choices to remain the same over a wide range of players, but he wants some assurance that *each* player has the opportunity to make choices about the essential concepts of the game. If games are based on strategies and students learn by making strategic choices, each student needs to have the opportunity to choose for the game to be effective. This does not mean that every student must participate in the *same activity* but rather for any given set of activities in a game, each student must have the opportunity to make the *same choices*. In a great many simulations, many students play "minor" roles. The teacher needs to be sure that even a minor role includes the basic choices in a game.

The logical organization of activity is as important to a game as it is to any learning experience. The phasing of activities can be crucial to the success of the game. If the activity rests on some information that the students have developed in a previous part of the game, it must be sequenced so that the information is provided. If the activity needs to be organized in a specific way to highlight the choices of players, then that organization needs to be specified. The logic of choices should be clear in the staging of the game. In a voting game, for example, where players must make choices between party loyalty and issue positions which contradict the party platform, the loyalty must be developed in a set of choices prior to the issue choices. Otherwise, the choice between party and issues is meaningless because the player has not had adequate opportunity to develop a party loyalty.

Thus the criteria of inclusiveness of all players in essential choices and sequencing of activities are of prime importance to the final learning outcome of a game. In a large part, these two criteria determine whether or not a game can maintain its momentum as an effective learning experience throughout game play. In the final evaluation the organizational parts of the game need to be compared to the choices, moves, and rules which form the knowledge base. The game should be organized so that students can give careful consideration to the major strategies in the game.

Question #6: What summary activities conclude the game?

Summary sessions can occur in many forms. Students may be asked a series of questions, organized into discussion groups, or asked to analyze data that they have created in the course of the gaming experience. Whatever form the session takes, it needs to encompass two different summary tasks: (1) summarization and analysis of what is learned, and (2) application of what is learned. Both components are crucial to the game.

The debriefing session is centered around the central ideas of the game. In a sense, the debriefing session represents a "mini" game in and of itself: a recreation of the fundamental structure of the gaming situation. In addition, the session often uses applications such as case studies, suggestions for exploration of reading material, or the student's own experience to draw out and reapply the information learned. Without the application knowledge, the teacher has very little assurance that the learning from the game has any carry-over to other contexts.

The teacher will normally find debriefing outlined in a series of summary questions following a game. The central evaluation question becomes: Does the debriefing session offer an adequate summary and application lesson for the game? The adequacy of the summary provided in debriefing can be most effectively demonstrated by pairing the educational objectives stated in the teacher's guide and the questions provided for debriefing. Ideally, the basic concepts and relationships in the objectives are linked directly into the questions. The degree to which this is true determines to a large extent whether or not the game has the capacity to accomplish its objectives.

One example of an inadequate debriefing tactic employed by a great many simulation designers is to concentrate debriefing questions on an evaluation of the simulation *per se* rather than its conceptual content. The problem is that the objectives of a classroom simulation are not to create a better simulation, but to teach students something about the substance of the problem that the game poses. Substantive questions can be reached indirectly by this method, but it demands a great deal of outside knowledge on the part of students both about the problem and about the development of a game.

A second typical case of an inadequate debriefing structure is a series of questions which focus on the particular moves or choices in the game without an attempt to generalize beyond the player's participation. Students often find it hard to go beyond a particular play through which they "won" the game or one which cost them a winning outcome. However, the objectives for any game extend beyond the particular situation it represents, and the debriefing questions should provide a linkage between the general problem situation and the particular plays in a game.

Ideally, then, a set of debriefing questions could be paired with the objectives in the voting game as follows:

Objectives	*Debriefing Questions*
1. Students can determine a general relationship between party identification and voting behavior.	1. What was the most important factor influencing your decision to vote?
2. Students can determine how issue position and candidate appeal influence voters in making decisions about voting.	2. What other major factors influenced your vote?
3. Students can determine the conditions under which a voter switches parties in voting.	3. What made some players switch from their traditional parties in this election?

Each objective is matched by a debriefing question which focuses upon the decisions made by each player in the game. The students are then asked to draw generalizations which extend beyond the gaming situation to national elections.

The application component of debriefing often appears in the form of a case study from a very different problem situation. An abstract or a concrete problem can be presented for students to solve. At times, students may be asked to construct their own case, or even their own game, in order to demonstrate knowledge of the game in another context. Either way, the application situation should offer a roughly analogous case to the game. It should contain most of the central concepts used in the game, with some variation. The analogous concepts give the student a basis for determining similarities between the gaming situation and other situations. The different concepts allow the students to contrast the gaming situation with others. The essentially comparative nature of the application material, then, provides the student with a way of transferring his knowledge to another situation in which he can make useful distinctions between the way behavior is the same and varies in different situations.

Thus debriefing becomes a key element in the evaluation of a game, for it is only through the summary questions and applications that the teacher can determine whether the game has the potential to reach its objectives. The problem statement can be clear and conceptually rich; the choices, moves, and rules can reflect the problem accurately; and the organization can provide an effective dynamic for the game; yet without some means of linking the gaming situation to learning outcomes, the teacher has no way to be sure the knowledge base is effectively transmitted to student players.

Conclusion

Each of the six questions has contributed to the identification of an important part of the knowledge base of any game. Through these questions the teacher can determine the central problem on which the game is built, the choices, moves, and rules which provide a transformation of the problem into a gaming situation, the organization which maintains the dynamic of the game, and the summary activities which determine whether its objectives are achieved. The analysis of these component parts and how they interrelate has led to an evaluation of a game as a whole.

The criteria developed here for evaluation are not inclusive. The game may fail as a learning experience for an entire set of reasons which the criteria do not tap. The teacher may not organize the gaming environment well. The students may not understand the game. The instructions may not be clear when the teacher enters the actual playing situation. However, the questions and criteria do give the teacher one major assurance: the game has the *capacity* to teach students a great deal.

Only a rare game will completely and positively demonstrate this capacity to its fullest extent. The criteria are by no means developed for an all or nothing, use or not use, evaluation of a game. Most games, like most students, will fall somewhere in between maximum capacity and failure. The teacher remains the judge of whether the game fails so desperately on one criterion that it should not be used in his classroom. However, if the game or game description does not give the teacher enough information to identify and minimally evaluate its major components, then the teacher is incurring a decided risk using any game.

The avoidance of the risk is important because games can misteach much more easily than they can effectively contribute to learning. The development of classroom games is still in its infancy and a great many games reflect the growing pains of unsound if not dysfunctional attempts at producing a finished product which is useful in the classroom. The teacher needs to view games as an intelligent consumer would view a product and pay a great deal of heed to the economic caveat "Let the buyer beware." The questions and criteria represent an attempt to facilitate well-reasoned consumption of classroom games on the part of teachers by focusing on the primary concern which motivates their choice: the capacity for a game to provide a sound and interesting learning experience for students.

D. Using Games and Simulations for Classroom Instruction: Cautions and Procedures

Although simulations and games are relatively common to most teachers, many still do not know how or when to use them, what might be gained from their use, or how to expect a class of students to react while participating in the exercise. This section is intended to provide some insights into these problems for the classroom teacher.

Some Precautionary Notes

First of all, what is educational simulation-gaming and what can it accomplish? To answer this, Paul Twelker has made the following statement about the potential of simulation in learning:

> Simulation is a means for letting learners experience things that otherwise might remain beyond their imagination, a means to practice skills safely and without embarrassment, and perhaps even discover insights into problems now plaguing mankind.

Hall T. Sprague has elaborated on these points by developing an "inventory of hunches" about simulation as educational tools.*

> (1) Maybe simulations are "motivators." Their main payoff may be that they generate enthusiasm for or commitment to: (a) learning in general, (b) social studies or some other subject area, (c) a specific discipline like history, (d) a specific course, or (e) a specific teacher.
>
> (2) Maybe a simulation experience leads students to more sophisticated and relevant inquiry. That is, perhaps the important thing is what happens after the simulation is over, when students ask about the "model" which determined some of the elements of the simulation, about real-world analogues to events and factors in the simulation, about processes like communication, about ways of dealing with stress and tension. Maybe participation leads naturally into a critique and analysis of the simulation by the

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students, and maybe this can lead easily into a model-building experience. . . . And maybe the greatest learning occurs when students build their own simulations.

(3) Maybe simulations give participants a more integrated view of some of the ways of men. Maybe they see the interconnectedness of political, social, interpersonal, cultural, economic, historical, etc., factors. Maybe simulations help people understand the idea of a "social system." Maybe the simulation experience helps them integrate ideas and information they already had.

(4) Maybe participants in simulations learn skills: decision-making, resource allocation, communication, persuasion, influence-resisting. Or maybe they learn how important those processes are. Maybe they learn about the rational and emotional components of these skills.

(5) Maybe simulations affect attitudes: (a) maybe participants gain empathy for real-life decision-makers; (b) maybe they get a feeling that life is much more complicated than they ever imagined; (c) maybe they get a feeling that they can do something important about affecting their personal life or the nation or the world.

(6) Maybe simulations provide participants with explicity, experiential, gut-level referents about ideas, concepts, and words used to describe human behavior. Maybe everyone has a personal psychology or sociology . . . maybe a simulation experience brings this personal view closer to reality. Maybe people know many things they don't know they know, and simulations act as an information retrieval device to help bring this knowledge to consciousness.

(7) Maybe participants in simulations learn the form and content of the model which lies behind the simulation. That is, in a corporation management simulation, maybe they learn about the ways in which certain aspects of the marketplace are related; in an inter-nation simulation, maybe they learn the relationship between the relative satisfaction of political influentials and the probability that leaders will retain office.

(8) Maybe the main importance of simulations is their effect on the social setting in which learning takes place. Maybe their physical format alone, which demands a significant departure from the usual setup of a classroom (chair shuffling, grouping, possibly room dividers, etc.), produces a more relaxed, natural exchange between teacher and students later on. Since simulations are student-run exercises, maybe they move "control" of the classroom from the teacher to the structure of the simulation, and thereby allow for better student-teacher relations. Simulations are usually very engaging, maybe one product of such engagement is that students/teachers drop their usual interpersonal facades, and maybe this leads to a more open classroom atmosphere in later sessions. Maybe simulations have their main effect on the teacher: perhaps he sees his students as more able than he had thought before, and the result may be that he looks to himself more to explain failures in the classroom. Maybe simulations—like any new technique—cause teachers to look at their normal teaching methods with a more critical eye. Maybe simulations' main payoff is that they create student enthusiasm in one classroom which may spread to informal student channels throughout the school.

(9) Maybe simulations lead to personal growth. The high degree of involvement may provide some of the outcomes hoped for from T-groups, sensitivity training, basic encounter groups, etc. . . . that is, a better sense of how one appears to others; discovery of personal skills, abilities, fears, weaknesses, that weren't apparent before; opportunities to express affection, anger, and indifference without permanently crippling consequences.

After reading Twelker and Sprague's views one can appreciate the possibilities and potential of this technique as viewed by simulation designers. Following are summary results which the authors have been able to glean from the research studies which have undertaken serious inquiry in this area (see Chapter II of this publication):

1. The use of simulation games generally results in greater student involvement, motivation and interest than do most other learning activities.
2. Generally, no significant differences have been found between the amounts of cognitive learning achieved by students taught with simulation-games and students taught by more conventional techniques.
3. Less able students are usually able to perform as well in simulation-games as brighter students—i.e., winning the game.
4. Males usually perform better in simulation-games than do females—i.e., winning the game.
5. Although less able participants perform as well in the game as brighter students, the brighter students learn more (as tested on a final test) and they are better able to articulate their winning strategies. Less able students can perform the winning strategies but they cannot understand the reasons for the behavior nor can they articulate their understanding as well as brighter students.
7. The types of media used in the exercise have an impact on participant performance. If the simulation includes the use of both audio and visual media, the performance of participants improves compared to that when only one type of medium is used or none at all.
8. By participating in simulation exercises players may develop more empathy for the roles they are assuming and the complexities of the environment they are dealing with.
9. Repeated use of the exercises seems to improve the decision-making strategies of the participants.
10. Participants appear to develop a better understanding of system dynamics and respect for the complex interplay of variables in a social system.
11. Educational exercises like simulation-games seem to have similar impacts on different types of participant populations—i.e., age, intelligence, socioeconomic background and formal school differences do not seem to influence the motivation and knowledge gained from the exercise.

These summarized research results should be viewed with some caution. To date only a limited number of research studies have been completed in this area. The research which has been accomplished is, in many cases, suspect because of inadequate testing procedures, lack of adequate instruments, use of unsophisticated statistics, developer bias, and inability to determine important variables. Most simulation-game exercises are thought to teach different things than available tests are geared to evaluate. Until these important variables are identified and evaluation instruments are developed to measure such learnings, the real value of such techniques can never be truly determined. Simulation-games teach not only to winning strategies and cognitive performance, but to attitudes and interaction processes as well. It is suggested that more sophisticated attitude profiles, videotaping episodes, and formalized interaction models will have to be developed and employed in such future research. (See Chapter II, "Reviewing the Literature: A Review of Research on Instructional Games and Simulations in Social Science and Economic Education.")

Every teacher realizes that classrooms vary. What may be true for one may not be true for another. Consequently, the results of many poorly designed research studies involving a particular game or simulation may only be appropriate for that simulation-game and/or those students who were directly involved. Transferring and using such research results to other classes, teachers or localities may be as inappropriate as sending an Eskimo's sealskin parka to an inhabitant of the tropics.

Although the use of games and simulations has been one of the most widely discussed classroom innovations in education, surprisingly few conclusions have been reached regarding either their cognitive, attitudinal or interactive effectiveness. As with almost all other developers of educational games and simulations, game designers and users in economic education are in the peculiar position of having a technology, or applied science, before the theoretical science has been developed. While most observers would agree that games do teach, what, how or why they teach are yet to be precisely measured or explained. Alice Kaplan Gordon probably has described the dilemma best by suggesting that "educators are in the ironic situation of having found an answer without knowing the question."

Suggestions for Classroom Use

In order to gain maximum benefit from the use of simulation-games in the classroom, teachers must realize that games and simulations require as much or more teacher preparation time as most other classroom techniques, a change in the teacher's classroom role, careful organization, well-stated instructional objectives, and supporting curriculum. These exercises cannot be effective in isolation. They must be used in conjunction with other activities in a carefully planned unit in order to be most effective.

The operational procedure for using these exercises can be organized into four categories which could be labeled (1) teacher preparation, (2) student orientation, (3) playing the exercise, and (4) debriefing.

Teacher Preparation

Teacher preparation is probably the most important element influencing the success of a game or simulation exercise. The teacher must have enough understanding of the exercise's objectives, its system, its pressures and problems, and the frustrations encountered in the experience to operate effectively as umpire, coach, provoker, sympathizer, leader and final authority. He must move in and out of different roles with flexibility and insight to keep the experience self-sustaining. In order to fulfill these roles (which many times means not involving oneself in the actual play) a teacher must be well prepared. An exercise should be selected with objectives consistent with the objectives of the unit being undertaken. These objectives should be *explicit*, well thought out, and closely articulated with the materials, media and method under consideration. Remember that games and simulations represent tools of instruction; by themselves they are no better or worse than any other method of instruction. They should be used only when the teacher has determined that the game or simulation represents the most desirable means to the instructional end.

After a decision is made to employ a game or simulation exercise, the teacher should first play it with a practice group. These may be friends, fellow teachers or even one's family. The characteristics of the practice group are not very important; however, the "dry run" experience is crucial. It exposes the teacher to all the confusion and difficulties inherent in conducting almost all such exercises. If it is impossible to try out such a "dry run" play, then the teacher should try "walking through" it in his imagination. Carefully read the teacher and participant manuals. Try to imagine what confusions might occur in the minds of different students and be ready for their occurrence. Problems always arise, especially in the initial rounds of play, but they are never an insurmountable difficulty if the teacher has undertaken preplanning.

Student Orientation

Student orientation should familiarize the participants with the demands that will be placed upon them by participating in the exercise. After the teacher has given them a general introduction to the exercise, they should read the participant manuals. If students are unfamiliar with activities that involve role-playing, time should be devoted to its explanation and practice. If the participants seem confused about all the complexities of the activity, give them reassurances but do not spend a large amount of time trying to make all the directions and behaviors crystal clear. Generally, it only becomes more confusing. The best way to understand an exercise is to play it and work out problems as they arise. After the first round or two participants should grasp the conception of the game and play without difficulty.

Playing the Exercise

Throughout the exercise the teacher should circulate among the students. He should observe, listen to negotiations, offer suggestions where they seem appropriate and provide reassuring comments to those participants who seem to be doing well.

The teacher also has to keep track of time during the play. The organization of time, the movement from round to round, and insisting on behavior consistent with the rules of the game are all very important in most simulation-games and strict attention should be given to these procedural details. Students are conditioned to the fact that games are "fun" and the teacher must be prepared to pair the fun aspect with an educational end.

What should the teacher do if he overhears an inaccurate judgment or observes a participant respond in an inappropriate way which will likely prevent him from reaching the exercise's goals? Generally, a teacher should refrain from interfering. It is inherent in most exercises that poor judgments will likely result in poor performance. Generally, a player should learn by himself or in interaction with other players that there are more appropriate strategies to pursue. If incorrect judgments are not pointed out during the play, there should always be an opportunity to discuss these judgments and behaviors in the debriefing session which follows the actual play. A teacher should not respond to all overheard errors just to prevent the players from getting the factual information confused. If the primary objective of the teacher is to present only accurate, factual information, then there is little reason to use simulation-games.

It is important to remember that using simulation-games will invariably raise the noise and activity levels of the classroom. These exercises require student interaction. Teachers will have to decide what is appropriate (students still have to be able to hear other players), but they should not expect participants to play in passive, whisper tones. If that does happen it probably signals that the exercise is unsuccessful in teaching and involving the students.

It is wise for both students and teachers to remember the request that the poet Coleridge made to his readers—that they make a "willing suspension of disbelief" while reading his poems. This is quite appropriate for simulation-games as well. All such exercises are necessarily distortions of reality, usually distorted by simplification. As with all models, it is impossible to simulate fully and accurately an entire economy, system or topic. Obviously, many of the complexities and variables are simplified or even eliminated. As one participates in many exercises it is easy to see their limitations and slight distortions. A cynic can easily rationalize not taking the exercise seriously and question its usefulness. While participating in the exercise one must "suspend his disbelief" and accept the exercise on its own rules and objectives. It is later, in the debriefing session, that the exercise should be critiqued in terms of its ability to meet its stated objectives, its internal consistency, its interest level for the participants, and the extent of its distortion of reality.

Debriefing

Debriefing sessions are crucial to the success of the exercise. It is the time for participants to reflect upon and to draw conclusions from their experiences. Questions of the following nature are generally appropriate:

- What strategies did you use?
- Which strategies were most successful in accomplishing your goal?
- Why were they most successful and why were other strategies less successful?
- What conclusions (or inferences) can you make concerning the operation of this system?
- Do you think this exercise was realistic? What real experiences have you had or observed that verify your opinion?
- Would you like to modify this exercise (or the rules) in some way to make it more consistent with reality? How would you modify it?

After students have played and discussed an exercise, especially if they enjoyed the experience, they might want to develop their own simulation-game. This is often a very rewarding, although potentially frustrating, experience for students. This type of activity typically requires students to use content material along with modes of thinking that are consistent with *all* categories of Bloom's *Taxonomy of Educational Objectives*. Just as teachers often claim that they have never learned anything as well as they did when they had to teach the material, designers of games, even amateur ones, typically feel that the development of such exercises is a most valuable and demanding learning task. We think that this may be one reason why many of the learning objectives claimed by many simulation-game designers have never been verified by research. What the developers claim can be learned from playing the exercise may, in reality, be learned only from the process of designing the exercise.

If in reading this chapter the reader begins to develop the nagging suspicion that our discussion is not a ringing endorsement of educational games and simulations as the only answer to all teaching problems, his critical reading antenna is working well. Although the exercises discussed in this publication are an extremely useful and interesting part of a teaching-learning experience, they are not effective without other curriculum support—i.e., other materials, other activities, other media and a well-prepared teacher. Preliminary evaluations from teacher-users indicate that the best exercises perform the most effective teaching-learning experiences when used as part of a total curriculum plan.

E. References Relating to the Construction, Selection and Use of Educational Simulations and Games in Economics and the Social Sciences

General Descriptions and Discussions

Abt, Clark C., *Serious Games: The Art and Science of Games that Simulate Life*. New York: Viking Press, 1970.

This book is written for the lay public in an effort to explain the uses of educational games and simulations. It concentrates almost exclusively on the work done by the Abt organization. The book contains a series of anecdotes and suggestions but has no bibliography or references.

Abt, Clark C., "Why Educational Games Win Converts," *Nation's Schools*, 80 (October 1967), 92-93 and 118.

This article suggests that educational games and simulations may offer achievement and motivation gains at costs less than those of alternative instructional methods. Techniques are defined, examples are given, and hypotheses are made suggesting why simulation games improve teaching efficiency.

Baldwin, John D., "Influences Detrimental to Simulation Gaming," *The American Behavioral Scientist*, 12 (July-August 1969), 14-21.

It is the premise of this article that students learn best from simulations which require them to develop adaptive behavior appropriate to coping with the simulated environment. The author contends that many educational simulations are biased by structural design or administrator effects.

Beck, Isabel H., and Bruce Monroe, "Some Dimensions of Simulation," *Educational Technology*, 9 (October 1969), 45-50.

This article explains how simulation has been utilized in operations analysis, experimentation and training. Primary focus is given to educational simulations; how role-playing, games and simulation differ; and to the advantages and disadvantages of simulation as a method of instruction.

Bock, Barbara, "Games as Teaching Tools," *Educate*, 39 (September 1968), 27-31.

This article offers a rationale for the use of games in the areas of the social sciences and humanities.

Boocock, Sarane S., "Changing the Structure of Secondary Education with Simulated Environments," *Educational Technology*, 7 (February 1968), 3-6.

This article describes three structural defects in secondary education that tend to discourage learning and discusses how simulation games can directly attack these structural problems in the secondary classroom.

Boocock, Sarane S., and E. O. Schild, Editors, *Simulation Games in Learning*. Beverly Hills, Calif.: Sage Publications, 1968.

In this book the authors provide a "progress report on recent thinking and findings" in the area of simulation games used as teaching devices. They collected a series of papers and research projects that represented the state of the art at the time of publication. An extensive bibliography is also provided.

Brodbelt, Samuel, "Simulation in the Social Studies: An Overview," *Social Education*, 33 (February 1969), 176-178.

This review is one of five articles in the February 1969 issue of *Social Education* on the use and effects of games and simulation in the social studies. A special bibliography on simulation is presented at the end of the section.

Carlson, Elliot, "Games in the Classroom," *Saturday Review*, 50 (April 15, 1967), 62-64 and 82-83.

The author gives a general description of some of the games being used in educational institutions. The Nova High School Academic Games Project, Inter-Nation Simulation, the Carnegie Tech Business-Management Game, among others, are described in detail.

Carlson, Elliot, *Learning Through Games*. Washington, D.C.: Public Affairs Press, 1969.

This book identifies how strategy games are being used by schools, business firms, labor unions and others to achieve a wide range of objectives. It provides information about the use of games as learning devices at the elementary, secondary and college levels. Emphasis is placed on how games permit both academically talented and slow learners to discover for themselves principles that govern social, political and economic situations.

Chapin, June R., "Simulation Games," *Social Education*, 32 (December 1968), 798-799 and 803.

This paper reviews the simulation games available for the social studies and the status of research in the field.

Coleman, James S., "Academic Games and Learning," *NASSP Bulletin*, 52 (February 1968), 62-72.

This paper describes the unique attributes and objectives of academic simulations. Specific attention is given to structure and goal formulations. A similar article describing the use of simulation games developed at Johns Hopkins University can also be found in "Learning Through Games," *NEA Journal*, 56 (January 1967), 69-70.

Columbia Broadcasting System Films, *Games Futurists Play*. New York: McGraw-Hill Book Co., Inc., 1968.

This 26-minute color film introduces viewers to the methods of role-playing while trying to solve future social problems. Viewers observe two simulated situations.

DeKock, Paul, "Simulations and Changes in Racial Attitudes," *Social Education*, 33 (February 1969), 181-183.

This article describes an informal classroom study of student racial attitudes and the impact of a simulation (Sunshine) on these attitudes.

Garvey, Dale M., "Simulation, Role-Playing, and Sociodrama in the Social Studies," *The Emporia State Research Studies*, 16 (December 1967), 5-34.

The author describes the classroom usefulness of simulation, role-playing and sociodrama techniques for the social studies curriculum. This publication also contains an annotated bibliography on the same topics by Sancha K. Garvey.

Gillespie, Judith A., "Analyzing and Evaluating Classroom Games," *Social Education*, 36 (January 1972), 33-42.

This article provides guidelines for teachers in deciding what games should be used to teach students. The criteria or guidelines identify the games' problem, choices, moves, rules, organization, and conclusions as crucial variables that can be analyzed and evaluated by the teacher in making his or her judgment. The article explains the analysis in depth and uses specific examples of how this analysis is applied to the evaluation of a game concerning voting behavior. (See page 29.)

Glazier, Ray, *How to Design Educational Games*. Cambridge, Mass.: Abt Associates, Inc., 1969.

This concisely written manual is a step-by-step operating guide for potential developers of educational games. It suggests priorities for planning and considerations for content and interaction objectives. The booklet also gives a short explanation of learning theory as it relates to teaching games, surveys some of the research in the field, and includes a bibliography of games developed by Abt Associates, Inc.

Gordon, Alice Kaplan, *Games for Growth: Educational Games in the Classroom*. Palo Alto, Calif.: Science Research Associates, 1970.

This book examines the origins of games and their current uses. It contains specific descriptions of some available games, suggestions on how to use them in classrooms, directions on designing games, and surveys of current research in the field, and includes a current bibliography of available games for use in secondary and elementary classes.

Guetzkow, Harold, Editor, *Simulation in Social Science: Readings*. Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1962.

This volume consists of fourteen articles written on the use of "man,

man/computer, and all-computer" simulations in military and industrial use as well as their use in economics, political science, psychology and sociology.

Gunn, Angus, "Educational Simulations," in Phillip Bacon, Editor, *Focus on Geography: Key Concepts and Teaching Strategies*. Washington, D.C.: National Council for the Social Studies, 1970.

This chapter describes simulations available for use in teaching high school geography, reviews research on the effectiveness of educational simulations, and summarizes the advantages and disadvantages of using them as teaching techniques.

Haldi, John, and Harvey M. Wagner, *Simulated Economic Models*. Homewood, Ill.: Richard Irwin, Inc., 1963.

This book is an examination of how economic theory can be applied in a realistic way to show students its usefulness. It is a book intended for college instructors of economics who might wish to adopt existing games, especially business-management games, for use in the college classroom.

Haley, Bernard F., *Experiments in the Teaching of Basic Economics*. New York: Joint Council on Economic Education, 1966.

This publication includes a section on games and simulations which describes two macro simulation games developed by Herbert Fraser and John A. Carlson for teaching economics at the college level. This discussion is also found in the *American Economic Review*, 57 (May 1967), 642-651.

Hogan, Arthur J., "Simulation: An Annotated Bibliography," *Social Education*, 32 (March 1968), 242-244.

An annotated bibliography of the literature concerning the creation and administration of educational simulation models of the social environment.

House, Peter, *The Simulated City: The Use of Second Generation Gaming in Studying the Urban System*. New York: Pergamon Press, 1969.

This booklet describes a number of new computer-assisted gaming techniques as they might be used to identify and solve urban environmental problems. A similar discussion can also be found in "An Environmental Gaming-Simulation Laboratory," *Journal of the American Institute of Planners*, 35 (November 1969), 383-388.

Inbar, Michael, and Clarice S. Stoll, "Games and Learning," *Interchange*, 1 (1970), 53-61.

The authors present a selected review of research pertaining to the effects of natural and educational games on the participants. They point out the paucity of empirical findings in comparison with the quantity and scope of theoretical advances, and suggest lines of research that seem potentially fruitful.

Inbar, Michael, and Clarice S. Stoll, Eds., *Simulation and Gaming in Social Sciences*. New York: The Free Press, 1972.

This book primarily deals with simulation and game design. It generally describes the anatomy of simulation gaming from its origin to the present. The design and construction phase is well described through case studies of the actual construction process by well-known simulation developers. Additional design theory complements the case study discussions and facilitates personal game creation.

Ingraham, Leonard W., "Teachers, Computers, and Games: Innovations in the Social Studies," *Social Education*, 31 (January 1967), 51-53.

This article suggests that computer simulations may make substantive changes in the way our children are taught in school. Descriptions are given of some simulations in economics developed by the Board of Cooperative Educational Services.

Kaplan, Alice J., and Martin S. Gordon, "A Critique of 'War or Peace': A Simulation Game," *Social Education*, 31 (May 1967), 383-385.

This article describes some of the shortcomings of using games for fun, rather than for educational purposes. It points out weaknesses of the War or Peace game in its model and structure, which may lead students to a distorted understanding of foreign relations.

Kardatzke, Howard, "Simulation Games in the Social Studies: The 'Reality' Issue," *Social Education*, 33 (February 1969), 179-180.

This article responds to critics of simulation games who suggest students acquire naive and erroneous concepts about social reality from such exercises.

Klietsch, Ronald G., *An Introduction to Learning and Instructional Simulations: A Curriculum Guideline*. St. Paul: Instructional Simulations Inc., 1969.

This book gives a comprehensive discussion and analysis of the theories behind and notions of educational gaming and simulation. Problems of design, implementation, interaction and evaluation are described.

Klietsch, Ronald G., Fred B. Wiegman and Jim R. Powell, Editors, *Directory of Educational Simulations, Learning Games, and Didactic Units*. St. Paul: Instructional Simulations, Inc., 1969.

This directory includes an extensive annotated listing of materials in the area of educational games and simulations.

Kraft, Ivor, "Pedagogical Futility in Fun and Games?" *NEA Journal*, 56 (January 1967), 71-72.

This article is a critique of claims made about the usefulness of simulation games in the social studies. It is suggested that this teaching technique is being applied to inappropriate subject matter, and that games indoctrinate players to naive misconceptions.

Moskovis, L. Michael, "Simulation Revisited," *The Balance Sheet*, 52 (November 1970), 104-106.

This article discusses how the use of behavioral objectives and simulation might improve instruction in business education courses.

Nesbitt, William A., *Simulation Games for the Social Studies Classroom.* New York: The Foreign Policy Association, 1968.

This booklet introduces the social studies teacher to the classroom use and design of education simulation games. It gives descriptions and uses of a number of games—e.g., Empire, Market, and the Sumerian Game.

Ochoa, Anna, "Simulation and Gaming: Simile or Synonym?" *Peabody Journal of Education*, 47 (September 1969), 104-107.

In developing definitions and explanations for games and simulations, the author suggests some useful criteria for evaluating the usefulness of any particular exercise in the social studies classroom.

Persons, Edgar, "It's an Old Game in Vocational Agriculture," *American Vocational Journal*, 45 (September 1970), 34-36.

This article describes some of the simulations currently in use in the field of vocational agriculture.

Raser, John R., *Simulation and Society*. Boston: Allyn and Bacon, 1969.

This book discusses the entire field of simulation. It deals with theoretical controversy, philosophical and methodological considerations, research in the field, historical background of the subject, and the various uses of simulation.

Rodgers, Theodore S., "Computer-Assisted Instruction (CAI) and the Teaching of Economics," in Keith G. Lumsden, Editor, *New Developments in the Teaching of Economics*. Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1967.

This review article discusses alternative ways in which computer-assisted instruction can be employed in the teaching of economics.

Rogers, Virginia M., and Marcella L. Kysilka, "Simulation Games: What and Why?" *Instructor*, 79 (March 1970), 94-95.

This article gives a description of the alternative uses of simulation games in the elementary classroom.

Shaftel, Fannie R., and George Shaftel, *Role-Playing for Social Values: Decision-Making in the Social Studies*. Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1967.

Although this book is mainly devoted to the educational use of role-playing, it contains a chapter which discusses the use of models, simulations and games in general. It also includes an extensive discussion on teaching for values and attitudes in the social studies.

Shirts, R. Garry, "Simulations, Games, and Related Activities for Elementary Classrooms," *Social Education*, 35 (March 1971), 300-304.

In this article the author describes four elementary games (Queen Anne, the NASA Game, Explorers, and the Community Land Use Game) and makes several suggestions on how elementary teachers and students could construct their own simulations.

Social Studies Curriculum Center, Carnegie-Mellon University, *The Market*

Game—Use of a Simulation Game. New York: Holt, Rinehart & Winston, Inc., 1968.

This 30-minute black and white film demonstrates the inquiry method of teaching social studies through the use of a simulation game from the Holt Social Studies Curriculum, edited by Edwin Fenton.

Sullivan, James J., "The Economics Laboratory at UCSB," *Simulation and Games*, 1 (March 1970), 81-91.

A description of an economics laboratory which makes extensive use of time-sharing computer systems in assisting students better to relate economic theory to actual economic experiences; it allows them to formulate their own economic models and to conduct simulation experiences.

Tansey, P. J., and D. Unwin, *Simulation and Gaming in Education*. New York: Barnes & Noble, 1969.

Various types of games and simulations are described and analyzed in this book, as well as the advantages of simulation and the use of computers to create and control simulation and gaming models.

This, Leslie E., "What is Simulation?" *American Vocational Journal*, 45 (September 1970), 20-22.

This article is a nontechnical explanation of simulation as a teaching technique and as it can be applied to vocational education.

Towler, John, Lisa Montgomery and Judi Ward, "Simulation Games: How to Use," *Instructor*, 79 (March 1970), 96-97.

Strategies and suggestions are offered to assist elementary teachers in designing games for their courses or to adapt existing games for use in their classrooms.

Twelker, Paul A., *A Basic Reference Shelf on Simulation and Gaming*. Monmouth, Oregon: Oregon State System of Higher Education, 1969.

This annotated bibliography includes an extensive listing of the literature and organizations which deal with educational simulations and games. For a more comprehensive bibliography by Twelker, see also *Instructional Simulation Systems: An Annotated Bibliography* (Corvallis, Oregon: Continuing Education Publications, 1969).

Twelker, Paul A., *Instructional Simulation: A Research Development and Dissemination Activity*. Monmouth, Oregon: Oregon State System of Higher Education, 1969.

This report is the result of eighteen months of exploring issues in the field of instructional simulation. It discusses alternative designs for educational simulations and elaborates upon a thirteen-step design model. School and nonschool uses and research implications are also discussed. The thirteen-step design model is also presented in "Designing Simulation Systems," *Educational Technology*, 9 (October 1969), 64-70.

Wing, Richard L., *The Production and Evaluation of Three Computer-Based Economics Games for the Sixth Grade*. Yorktown Heights, N.Y.: Board of

Cooperative Educational Services, 1967.

This book gives an extensive description of the development of three computer-based games (Sumerian Game, Sierra Leone Game, and the Free Enterprise Game). It contains a rationale, examines related research, defines objectives and provides tests for evaluation. Detailed bibliographies on computer-aided instruction and games are also presented.

Youngers, John C., and John F. Aceti, *Simulation Games and Activities for Social Studies*. Danville, N.Y.: Instructor Publications, Inc., 1969.

This booklet is intended for elementary teachers and contains descriptions of the use of simulation games in the elementary classroom. Specified objectives and suggested activities are provided.

Zuckerman, David W., and Robert E. Horn, *The Guide to Simulation Games for Education and Training*. Cambridge, Mass.: Information Resources, Inc., 1970.

This guide contains annotated descriptions of over 400 simulations and games for all fields and levels of education and training. Discussion as to its preparation and rationale is given in "What is It You Want to Know," *Media and Methods*, 7 (October 1970), 42-44.

Classroom or Group Use Descriptions

Attiyeh, Richard E., "Policy Making in a Simulated Environment," in Keith G. Lumsden, Editor, *Recent Research in Economics Education*. Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1970.

This article explains and discusses the Macroeconomic Policy Game developed by the author. The equations determining the model, the computer program, and collegiate student behaviors are described in detail. Suggestions for alternative classroom uses are also provided. For discussions of earlier work with this game, see F. T. Dolbear, R. Attiyeh and W. C. Brainard, "A Simulation Policy Game for Teaching Macroeconomics," *American Economic Review*, 58 (May 1968); and Richard Attiyeh, "A Macroeconomic Model for the Classroom," in Keith G. Lumsden, Editor, *New Developments in the Teaching of Economics* (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1967).

Boocock, Sarane S., "Using Simulation Games in College Courses," *Simulation and Games*, 1 (March 1970), 67-77.

This article discusses the merits and alternative ways in which simulation games have been used in classes on urban sociology and social psychology.

Boot, J. C. G., "Management Games," in Keith G. Lumsden, Editor, *New Developments in the Teaching of Economics*. Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1967.

This article gives an extensive description of the collegiate use of two computer-based management games.

Bower, Richard S., "Computer Time-Sharing and the Teaching of Economics," in Keith G. Lumsden, Editor, *Recent Research in Economics Educa-*

tion. Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1970.

> This paper describes the use of computer-assisted instruction in the teaching of college-level economics at Dartmouth College. A specific description is given of the use of managerial economics simulations and of two simulation games, GLOOM and MACRO.

Burgess, Philip M., Lawrence E. Peterson and Carl D. Frantz, "Organizing Simulated Environments," *Social Education*, 33 (February 1969), 185-193.

> The purpose of this article is to provide some guidelines for the organization and administration of games and simulations in the social studies. The Inter-Nation Simulation is used as an example.

Cherryholmes, Cleo H., "Simulating Inter-Nation Relations in the Classroom," in James M. Becker and Howard D. Mehlinger, Editors, *International Dimensions in the Social Studies*. Washington, D.C.: National Council for the Social Studies, 1968.

> An explanation of the concept of social simulation is developed and is illustrated with a description of Inter-Nation Simulation. An earlier article describing Inter-Nation Simulation and its impact on students' attitudes can be found in "Developments in Simulation of International Relations in High School Teaching," *Phi Delta Kappan*, 46 (January 1965), 227-231.

Derell, Gene R., "Educational Games: Teaching a Strategy of Learning," *The School Counselor*, 16 (March 1969), 296-298.

> This article gives a short description of how a school counselor might use a simple game as a training device for students, planning successful student strategies for school behavior and in achieving school rewards.

Gearon, John D., "Labor vs. Management: A Simulation Game," *Social Education*, 30 (October 1966), 421-422.

> This article describes a role-playing simulation of a labor-management problem.

Gearon, John D., "Simulation and Stimulation: Teaching Politics and Government in High School Social Studies," *Social Education*, 32 (March 1968), 273-278 and 281.

> This article presents and discusses the use of a social studies simulation entitled A Mayor for Mount Van Buren.

Gearon, John D., "War or Peace: A Simulation Game," *Social Education*, 30 (November 1966), 521-522.

> This article describes the classroom use of a short international relations game designed for ninth graders.

Guetzkow, Harold, *et al.*, *Simulation in International Relations: Developments for Research and Teaching*. Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1963.

> This book is an overview of how simulation can be used to study international relations. The essays are now somewhat dated but they contain the most comprehensive description available concerning the use of Inter-nation Simulation for both research and teaching.

Guetzkow, Harold, Philip Kotler and Randall L. Schultz, ***Simulation in Social and Administrative Science***. Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1972.

> In this volume the authors compile a series of overviews and case-examples of simulation in social and administrative science. Essays on general simulation models, theories and methods in a variety of fields of social and administrative science are also included. Actual case-examples of simulation support the essays. These examples pertain to economic decision-making, psychological behavior, political processes, urban affairs and municipal budgeting.

Gunn, Angus M., "Simulation: The Game of Section," ***Social Education***, 33 (February 1969), 193-194.

> This article describes the classroom use of the game of Section, from the National High School Geography Project.

Humphrey, Doris J., "Review of Starpower," ***Simulation and Games***, 1 (December 1970), 449-456.

> The author describes classroom use of and player reactions to the game of Starpower.

Johnson, R. G., "Simulation Techniques in Career Development," ***American Vocational Journal***, 45 (September 1970), 30-32.

> This article describes how job experience simulation kits provide students with opportunities to experience several different types of jobs.

Joseph, Myron L., "Game and Simulation Experiments," ***The Journal of Economic Education***, 1 (Spring 1970), 91-96.

> This article gives a review of various experimental role-playing market games at the college level. The role of the computer in such simulations is also discussed.

Joseph, Myron L., and Phillip Saunders, "Playing the Market Game," in Keith G. Lumsden, Editor, ***Recent Research in Economics Education***. Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1970.

> This article describes alternative strategies and techniques for maximizing the classroom effectiveness of the Wheat Market Game. For other discussions and uses of this role-playing game, see Myron L. Joseph, "Role Playing in Teaching Economics," ***American Economic Review***, 55 (May 1965), 556-565.

Kurfman, Dana G., and Ina M. Phillips, ***Using Simulation to Involve Students***. Boulder, Colorado: High School Geography Project, 1970.

> This booklet is a HSGP teacher training kit in the use of educational games. Samples of games used in the HSGP are presented and discussed to familiarize teachers with the use of such exercises.

Lee, Richard H., "Cabinets in Crises," ***Audiovisual Instruction***, 14 (April 1969), 49-52.

> This article discusses the experimental use and results of a simulation game, Cabinets in Crises, in a five-part broadcast on educational television. A similar experimental television project is also reported by the same author in "The Most Dangerous Game: An Experiment in Viewer-

Responsive Television," *Audiovisual Instruction*, 13 (May 1968), 473-476.

Lumsden, Keith G., "The Promises and Problems of Games and Simulation," *The Journal of Economic Education*, 1 (Spring 1970), 85-90.
This review article discusses the impact of recent games in economic education on the behavior, learning and attitudes of students at the collegiate level. The Wheat Market Game developed by Myron Joseph, the Macroeconomic Policy Game developed by R. E. Attiyeh, *et al.*, and the microeconomic computer simulation games developed by Richard L. Schmalensee are all reviewed and described in this article. A similar review by Lumsden can also be found in *Recent Research in Economics Education* (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1970).

Maidment, Robert, and Russell H. Bronstein, *Simulation Games Design and Implementation*. Columbus, Ohio: Charles E. Merrill Publishing Co., 1973.
This book provides the reader with a concise description of the characteristics of simulation games. The authors provide a historical background for gaming and address themselves to the question of "What Is Learned Through Games?" An actual game, Pollution Control, is included in the book and much of the book revolves around the game spinning out a step-by-step, systematic approach to game processes, intricacies and construction.

Miller, Richard A., "Oligopoly and Merger: A Simple Classroom Game," *The Journal of Economic Education*, 2 (Spring 1971), 142-150.
This article explains the use of two games, Duopoly and Six Suppliers, in teaching college students about fundamental business behavior in oligopolistic markets. The games illustrate the oligopolistic characteristic of "mutual interdependence." The games and student reactions are described in detail.

Nelson, Warren L., "Simulation Review: Ghetto," *Simulations and Games*, 1 (September 1970), 341-345.
This article describes the reactions of sixth-grade students and teachers from inner city schools to the game Ghetto.

Radov, Karl, "Teaching Economics by Computer," in Keith G. Lumsden, Editor, *New Developments in the Teaching of Economics*. Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1967.
This paper reports the use and applications of two computer-based instructional programs developed and used at the University of California, Irvine: Basic Economic Reasoning (a tutorial program) and The Wheat Market (a simulation game).

Shelly, Ann C., "Total Class Development of Simulation Games," *Social Education*, 37 (November 1973), 687-689.
This article summarizes and evaluates a developmental model which has as its purpose the designing and validating of materials and procedures for use in teaching groups of college students how to create original simulation games. The author describes the "Model for Simulation Game Development" in detail and concludes from survey data that it has both the flexibility and structure necessary for classroom use.

CHAPTER II

Research on Instructional Games and Simulations in the Social Sciences and Economics

Chapter II is devoted to existing research which has been designed to establish the impact of simulation games as a teaching technique. The research studies reported in this chapter vary enormously in quality, scope, design and findings.

Part A provides an overview of our present understanding of the cognitive and affective results of game usage. Possible gaps in our understanding of the learning impact of games are also identified. Areas of needed research are suggested.

Part B provides a complete listing and brief abstract of research studies which have been carried out in the area of social science simulations and games.

A. Reviewing the Literature: A Review of Research on Instructional Games and Simulations in Social Science and Economic Education*

Donald R. Wentworth
Darrell R. Lewis

Few innovative teaching devices have held such amazing popular acceptance as has the use of instructional games and simulations. They have been used to teach groups as varied as elementary students, business management personnel, and generals. But for all their popularity, information is limited concerning their effectiveness as teaching techniques. Although nearly fifty studies currently exist which attempt to investigate the impact of educational games and simulations, these studies vary enormously in quality, scope, design, and findings.

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Some of the researchers have enthusiastically endorsed such exercises as "an ideal method for modernizing the social studies curriculum in secondary schools. . . . Simulation games can be one of the foundations for a truly vitalized educational system and . . . this technique, given the right conditions, can make a profound contribution to the growth and development of our young people so that they can be better prepared for life in the modern world" (Lee & O'Leary, 1971, pp. 345-6).

Other writers have been more cautious in their support for the potential of educational games and simulations.

> If in reading this . . . the reader begins to develop the nagging suspicion that our discussion is not a ringing endorsement of educational games and simulations as the only answer to all teaching problems, his critical reading antenna is working well. Although the exercises . . . are an extremely useful and interesting part of a teaching-learning experience, they are not effective without other curriculum support—i.e., other materials, other activities, other media, and a well-prepared teacher. Preliminary evaluations from teacher-users indicate that the best exercises provide the most effective teaching-learning experiences when used as part of a total curriculum plan (Lewis & Wentworth, 1971, p. 8).

While these two viewpoints are not completely polarized, there appears to be some tropical atmosphere separating them.

What is needed is a systematic review of the research conducted on the effects of games and simulations as a basis for deciding whether the findings confirm the assertions made about educational simulations and games. This review article is an attempt to summarize the research that has been conducted, generalize from the results, indicate particular costs and benefits encountered when games and simulations are used, identify voids in the field, and indicate some directions for future research.

Although most simulation games are designed to influence the cognitive, attitudinal, and behavioral characteristics of participants, most of the research dealing with such exercises have investigated or focused only on aspects of one or two of these variables. Consequently, the available research can be classified into six categories having to do with the investigation of: (1) the feasibility of using simulations or games in current educational institutions; (2) personal characteristics of the participants as variables related to their performance in such exercises; (3) student behaviors, strategies, or interactions during participation in such exercises; (4) the use of learning games to teach skills of thinking; (5) the impact of games and simulations on other cognitive learning; and (6) the impact of such exercises on the participants' interests and attitudes. In the first part of this article, studies in these six categories will be reviewed and discussed. Then, some conclusions will be drawn about the effects on cognitive learning, attitudes, and behavior, and some implications for future research will be suggested.

The Use of Learning Games in Current Institutional Structures

Many early developers of games and simulations were concerned that such techniques would be directly contrary to established patterns of teaching and would require behavior unacceptable in public schools. Two studies (Mountain, 1960; Shirts & Sprague, 1966) investigated the merits of this apprehension.

Mignonette Mountain (1960) sent one hundred educational games to several public school teachers to use and evaluate. A subjective questionnaire was then completed by the teachers. The results indicated that the teachers thought: (1) educational games can serve as useful teaching aids in introducing and reinforcing knowledge, attitudes, and skills in language arts, arithmetic, and social science; (2) they can be used effectively in grades one through twelve; and (3) they can motivate the interests of the students. The credibility of this study is strained, however, because the reliability or validity of the tests was not checked and the teacher participants were not selected randomly. Few controls were used in the study, and several biases were obvious in the data collection.

Shirts and Sprague (1966) conducted a similar study: (1) to investigate if educational games could fit within the time, space, administrative, and curriculum constraints of the schools; and (2) to develop hypotheses about the use, effects, and potentiality of such exercises in school systems. Few research controls were established and most of the results reported were subjective. They found that teachers thought that games were potentially important means to help students become active, interested learners.

Most other studies have merely assumed that such educational exercises could operate within institutional constraints, and little evidence has been found to dispute or reinforce this assumption.

Personal Characteristics

Only five studies (Allen, Allen, & Miller, 1966; Fletcher, 1968; Anderson, 1969; Wing, 1966; Wentworth, 1972) have tried to investigate the relationship of the personal characteristics of the participants to success in games and simulations.

A study by Wing (1966) on the use of a computer game at the sixth-grade level reported that students could use and understand a computer game without difficulty. Student competence with the computer did not appear to be correlated with a student's sex or ability level.

Allen and his associates (1966) investigated the differences in success experienced by students of different sexes in a game called WFF'N PROOF. They found that although boys gained more knowledge from the experience, girls could match their performance by retaking the test given at the end of the experiment. This result could not be explained and does arouse some suspicion about the results of the experiment.

Fletcher (1968), focusing on elementary students participating in a social studies game, found that boys usually out-performed girls in game play (i.e., they achieved the most points in the game); but independent cognitive tests indicated that girls learned just as much as boys. This report conflicts with a study conducted by Anderson (1969) in which a learning game was found to be more effective in teaching content to boys. Fletcher also found that the ability level of the students made little difference in game performance, although on independent cognitive tests brighter students performed better than lower ability students. Wentworth (1972) found no differences in performance between junior college males and females.

The available sketchy information and confusing results indicate that this is a fertile area for further investigation. Most educational research has assumed that educational methods have the same impact on all students. In reality some methods of instruction may be optimal for some students and detrimental to the learning of others. It is important to determine whether the positive and negative results of participation in learning games and simulations are associated with a student's age, sex, verbal ability, emotional make-up, social background, economic status and a host of other characteristics that identify the uniqueness of an individual.

Student Behaviors, Strategies, and Interactions Exhibited During Game Participation

Studies falling into this third category were concerned with the learning processes encouraged by participation in learning games. Games and simulations have been identified as valuable learning experiences because they provide a setting in which students are allowed to try out behavior, to learn from experience, to predict consequences, and to use feedback to achieve goals. Such experiences may be regarded as poignant, important, and educational; yet research in this area which might support these contentions has been superficial and confusing.

In a recent study, Feldmiller (1970) recorded, coded, and categorized the verbal behavior of participants in a home economics simulation game entitled *Choice and Chance*. She found that participants tended to ask more procedural and directional questions at the beginning of the simulation. These types of questions gradually decreased over time. At the same time, statements and questions referring to the situation, the real world, and particular concepts increased. Lastly, participants began to show greater independence from instructor direction as they became more familiar with the simulation. Although this study utilized reasonable controls in the collection and analysis of data (although participants were not randomly chosen), the value of its conclusions was never adequately discussed, not going beyond the obvious.

With mixed success, other studies have tried to identify important behaviors stimulated by participation in games. McHenry (1969) investigated the effect of the exercise *Life Career* on students' interests. He hypothesized that students would become more interested in possible careers and make appointments to see counselors about such career options. In other words, the experience might stimulate a self-referral process in career education. His results did not support this hypothesis. Livingston (1970a) hypothesized that games and simulations could serve as advanced organizers for students and thus facilitate their learning. Again, the results did not support the hypothesis. Wentworth (1972) investigated changes in student verbal behaviors while they participated in the game *Marketplace*. The Reciprocal Category System was used to identify the affective climate in the classroom and it was found that student responses to each other became more positive, cooperative, and reinforcing while the students participated in the learning game. The Equivalent Category System was used to measure the level of cognitive thinking during game participation. It was found that students exhibited verbal responses of a memory-recall nature about 85% of the time, both during game participation activities and other class activities. The learning game did not encourage participants to exhibit verbal behaviors that evidenced convergent, divergent, or evaluative thinking.

One of the more interesting studies in this area was conducted by Inbar (1966). He identified three factors which might influence participants and account for the differential impact of a game on members of a set of players. These factors were: (1) variations in the players' personal characteristics; (2) differences in their predispositions toward the playing of a game; and (3) differences in the characteristics of the groups of which they were members.

He found that the major factors related to participant behavior were the characteristics of the group, particularly group size. He also found that predispositions toward game playing were correlated with the overall impact of the game. McFarlane (1970) attempted to measure the differential impact of playing the *Parent-Child Game* on students of different racial heritage and social class backgrounds. He found no significant differences in performance between different racial and socio-economic groups.

The *Parent-Child Game* was used by Schild (1970) to identify variables crucial to winning in game play. He maintained that previous research in games and simulations was inadequate because it measured the wrong variables; most of the previously measured variables were unrelated to behaviors needed for winning. He suggested that simulations shape student behavior by reinforcement (winning) and that this is how games should be evaluated—i.e., does the simulation or game set up contingencies which reinforce effective strategies for successfully competing in the game? He used four groups of secondary and college students to play the *Parent-Child Game* and found consistency from group to group in the type of strategy used by players to win the game. He concluded that the behavior of players was shaped by the structure and rules of the game, rather than other influences, and that strategies learned in one game transfer to another.

A study by Fletcher (1968) is closely related to Schild's work. By systematically varying the feedback system and the apparent goal in the games used, he tested how elementary students learn content from games. He found that increasing the difficulty of the goal had only a marginal effect on student cognitive learning. Reviewing the feedback from previous plays had a positive effect on student learning of content although it did not improve player performance in the game or in their choice of playing strategies.

A more recent attempt to define the crucial key variables to measure educational outcomes of game play was conducted by Fletcher and Dobbins (1970). Ability to make accurate predictions was the important dependent variable tested. The impact of repeated plays of a particular game on this student characteristic was investigated. The results indicated that the experimental group, which participated in a number of repeated plays, made more accurate predictions than did the control group.

Some positive results have been obtained by Schild (1970) and Fletcher and Dobbins (1970). However, these studies need replication. Also, other promising variables must be more precisely identified and observed through controlled testing before adequate generalizations can be formed concerning the impact of learning games on student variables related to the process of learning.

Teaching Skills of Thinking

The effect of learning games on student skills has been largely ignored. The two exceptions to this statement are studies by Riegel (1969) and Garvey and Seiler (1966). Both studies measured the impact of game participation on student critical thinking skills. Riegel compared an experimental class using *The Economic Decision Games* with a control class learning economics via a lecture-discussion method of instruction. Students' critical thinking skills in both classes were measured by the Watson-Glaser Critical Thinking Appraisal. No significant differences were found on the pre- and post-test scores of the two groups, but it was determined that the experimental group had a significantly greater retention of critical thinking skills. There was no satisfactory explanation for this result, and the conclusion certainly invites doubt until the study is replicated.

In the teaching of international relations to high school students, Garvey and Seiler compared experimental classes using an adapted version of the *Inter-Nation Simulation* exercise with control classes employing conventional lecture-discussion methods. Students' skills in both groups were measured by the Watson-Glaser Critical Thinking Appraisal and the Cornell Critical Thinking Test. The study provided little evidence to support the hypothesis that the use of simulations in conjunction with other teaching techniques enhances the ability of the student to acquire more factual and conceptual knowledge or to think critically. In fact, the study indicated that the control sample performed better on most tests than did the experimental sample.

Further investigation of the influence of game play on student skills is clearly needed. Games and simulations may help students learn to acquire information through listening, reading, and observation. Game play may require students to practice skills of organizing and evaluating information. Student oral skills may become more accurate because of greater practice and personal involvement. Games and simulations may have great potential for developing student academic skills, just as simulation exercises have excellent records in teaching astronauts how to manipulate space craft. However, the research to date has not confirmed these assertions.

The Impact of Games on Other Cognitive Learning

Most of the studies in the area of games and simulations have concentrated on the cognitive and affective results of student participation in learning games. In the cognitive area there has been some conflicting evidence about student achievement. Usually learning games and simulations have been found to be neither significantly better nor worse than other learning experiences in their impact on student achievement as evidenced by paper and pencil test scores. Six studies (Allen, Allen & Miller, 1966; Monroe, 1968; Wentworth, 1972; Duke, 1964; Baker, 1966; Boocock, 1966) stand as exceptions to this generalization. Two of these studies (Monroe, 1968; Wentworth, 1972) found that students in experimental groups involving game play scored lower on content than did students in control classes who had not used learning games. Monroe found that lectures were more effective in teaching theory and that a game was more effective in teaching system dynamics. Wentworth found that the use of the learning game *Marketplace* in a junior college introductory economics course resulted in a significant retardation of student learning of economics.

Allen and his associates (1966) found that students using the WFF'N PROOF game scored significantly better on a test devised by the author than did a control group of students. A suspicion of possible developer bias is suggested by some confusing results from the study. In addition, a study by Bowen (1969) contradicted the findings in the Allen study. Bowen used the WFF'N PROOF game, as did Allen and his associates, with fourth-grade honor students and found no significant difference in mathematical performance in the students who used the exercise and those who did not. The failure to replicate the earlier study's results suggests that further inquiry is needed before any generalizations can be made about the game's effectiveness.

Baker (1966) studied the performance of students in a history course. He found the experimental group participating in a history game performed better on content tests than did the control group, but his study also appears to contain considerable bias. The researcher taught both the control and experimental groups himself, developed the measuring instrument, and used an exercise which was not representative of the exercises usually considered part of this field. The students were involved in a long-term role-playing situation rather than an actual game or simulation.

Stadsklev (1969) ran an experiment similar in research design to the study conducted by Baker. Stadsklev's analysis found no significant differences in cognitive gains between students in the control and treatment groups. Although this study was not an attempt to replicate the Baker study, it was similar in design, operation, implementation, and duration. The findings suggest the results of the Baker study should be viewed with caution.

The studies by Duke (1964) and Monroe (1968) found positive results for game participation, but the research designs suffer from inadequate controls. The Duke study used a "home bred" testing instrument which was not subjected to validity or reliability tests. This suggests that a developer bias may be present, and the validity of his positive results is questionable. The Monroe study was marred by a haphazard selection of participants and by subjective testing. His results should not be taken seriously until the findings are replicated.

An imaginative and complicated study by Boocock (1966) utilized a research design with greater controls than the previously mentioned studies. She used commercially available games, determined the reliability and validity of the measuring instruments, and provided a control group-experimental group comparison. It was an experiment which could be replicated by another researcher. Boocock collected data from experiments with seven different games using her own tests of student learning. The experiment was conducted during a 4-H convention using the students attending the convention as the population for study. Participant responses to pre- and post-tests of learning were compared and Boocock concluded that the study provided empirical evidence for four general types of positive learning: (1) inducement to student motivation and learning; (2) vicarious experience; (3) intellectual learning; and (4) changes in student attitudes. Boocock's conclusions must be taken with caution. The tests used were of her own construction, the data were collected from a sample of 4-H convention participants (which may reflect a population bias in favor of high ability students), the experimental design involved an unusual form of control group comparison, and her conclusions were somewhat speculative. Still, this study is one of the better research efforts available in the field.

A number of early studies tried to be quite specific in their testing of student cognitive learning by using multiple-choice tests of content understanding. Garvey and Seiler (1966) compared the factual and conceptual knowledge high school students learned by playing ***Inter-Nation Simulation*** as opposed to conventional lecture-discussion techniques. Robinson, Anderson, Hermann, and Snyder (1966) tried an experiment with a similar research design involving college students, while Targ (1967) used elementary students with a modified version of the ***Inter-Nation Simulation***. All three studies reported no significant differences in student learning between the experimental and control groups. But they all used instruments developed by the researchers themselves. This makes it difficult for anyone to attempt a replication of these studies. If instruments were used that were more readily available to the general public, more efforts of replication might be attempted.

Studies frequently seem to come up with results unique to the particular time, place, and population, and the tests used may be an important factor.

Boags (1970), Hart (1969), Newfield (1969), and Cordtz (1969) ran studies at the collegiate level using simulation exercises in a variety of courses. Each study used non-standardized testing instruments and inadequate experimental controls to measure student learning, and the results demonstrated no significant differences in student cognitive performance.

Chartier (1972) used the game *Generation Gap* with undergraduate students in an introductory speech class to investigate the cognitive impact of combining a simulation game with what the author described as "instrumented discussion." He found no differences between the level of cognitive learning in the experimental and control groups. Thompson (1968) conducted a study on the effect of computer gaming on student performance in junior college economics courses. He found no significant results on student cognitive performance, but his use of statistical analysis was unusual and quite useful. Most studies in the field of games and simulations have used the t-test to determine the significance of differences in student performance. Thompson used multiple regression analysis in his study. With this technique, the researcher can hold constant other factors (such as age, prior background, and ability level) while measuring the relationship of the experimental variable (game participation versus nonparticipation) to the cognitive performance of students. This technique gives greater precision and predictive power to the findings of the investigation than does t-test analysis.

Emery and Enger (1972) also used the multiple regression method of statistical analysis. They found that a computer game used to help teach introductory economics was significantly related to student achievement and interests. Their findings must be viewed cautiously, however, because of the small sample used in the study.

The efficiency of using a computer game to teach was also investigated by Wing (1966). Although he found that using computer gaming techniques did not increase the cognitive learning of sixth-grade students, he did find that students in the experimental group using the computer attained approximately the same amount of learning in half the time needed to teach that information by conventional classroom instruction. These may be significant findings for the field of simulation and gaming but, again, replication is needed before anyone should make large-scale curriculum decisions involving such high-cost technology.

There are several other studies which have used simulations or games to teach economic concepts to participants. Anderson (1969) conducted a study comparing the performance of a high school class in consumer economics taught with simulation with that of another class taught the same information using lecture-discussion teaching techniques. He found no statistically significant differences in knowledge for the two groups. Cohen (1970) ran a similar study, but with fewer design controls, and also reported no significant differences in student performance. Dooley (1969) compared performances between fourth-grade students taught using the ***Market Game*** and students taught by the lecture method. Although the adjusted mean score of the experimental group was higher, the difference was not statistically significant. The same conclusion was reached by Riegel (1969) in his study of twelfth-grade students in an economics course.

The review of the research to this point suggests the conclusion that games and simulations have little measurable impact on student cognitive learning when compared with other teaching techniques. Moreover, nearly all of the studies reviewed have research design limitations. This limitation involves population selection, test construction and validation, inadequate controls in the research design, and limited statistical analysis of the data. It would be unwise to draw any firm conclusions about the impact of learning games on student learning from the research to date.

The Impact of Learning Games on Participants' Interests and Attitudes

Educational games and simulations seem to have had their greatest impact in the area of affective learning. Most researchers have reported positive student response after participating in a simulation or game.

Early studies relied on subjective evaluations to measure students' affective learning. Garvey and Seiler (1966) used ***Inter-Nation Simulation*** with high school students and reported high student interest and response, although this was an informal observation rather than a conclusion drawn from empirical data. Cohen (1970), Dooley (1969), and Wing (1966) all reported similar results drawn from subjective observation. Cordtz (1969) evaluated a simulation game used in a graduate course in American studies and found, based on a questionnaire issued by the instructor, that the students in the experimental class expressed higher preference for the course and content. Lloyd (1970) used this same form of data collection in his attempt to measure the effect of simulation on college student attitudes, but his study had no conclusive results. In the above cases, interest was assessed by casual observation or subjective written evaluations. No attempt was made to obtain objective data.

In two studies, attitude scales were developed as instruments to measure changes in student attitudes toward learning games as classroom activities. Baker (1966) and Stadsklev (1969) pre- and post-tested their students with attitude scales and found significant differences in student attitudes toward learning, favoring the simulation classes. These studies did obtain data in a more objective manner than the previously mentioned studies, but no attempts were made to verify validity or reliability of the instruments.

These seven studies tried to measure the students' attitudes toward the techniques of gaming and simulations as learning experiences. Other studies have attempted to measure changes in student attitudes toward particular subject or interest areas influenced by game participation. Livingston (1970b) conducted a study investigating student attitudes toward the poor, and developed a pre- and post-questionnaire to measure such a change. He found that students' attitudes were significantly more favorable toward the poor after they played the exercise ***Ghetto***, but he also found a significant decline of student interest in the subject of poverty. Livingston (1970a, 1972) conducted two other studies to determine the impact of a simulation game on motivation and political attitudes of junior high school students. He obtained no significant results, except that students became more tolerant of political logrolling.

Four studies have been conducted which either used or modified an available attitude measure. Hart (1969) used a semantic differential attitude scale to test for differences in the polarization of attitudes of college students in political science after they had participated in a simulation (experimental) or a lecture (control) course in political science. He found no significant differences between groups in degree of polarization of attitudes. Clarke (1970) used a similar instrument to evaluate students' reactions to a simulated national political convention. He reported positive reactions to the experience, but no statistical analysis was described. Wentworth (1972) used a semantic differential to measure the attitudes of students toward economics and the instructional process. No relationship was found between participation in the learning game ***Marketplace*** and student ratings of economics or the instructional process.

Two studies (Boags, 1970; Stahl, 1970) used the Moods Adjective Checklist to measure attitudes and attitude change. Boags (1970) attempted to measure change in selected affective factors when students participated in a simulation game. He placed social work graduate students into one of two settings, one competitive and the other cooperative. He found greater positive change in the affective orientation of students in the cooperative setting than the competitive one. Stahl (1970) tried to determine how the mode of presentation affected students' affective reactions to the resolution of simulated problems. He found that greater visual media use is more effective in affecting positive attitude change in students than using simulations with little or no visual media.

Five other studies (Targ, 1967; DeKock, 1969; Corbin, 1971; Boocock, 1966; Vogel, 1970) were conducted in attempts to determine the impact of playing a learning game upon specified social, political, or economic attitudes of students. Targ (1967) studied the impact of playing an elementary ***Inter-Nation Simulation*** exercise on national and international beliefs of students. He found that students became more tolerant and positive in their beliefs after they had been involved in the simulation, with the relationship less strong for third-grade children than for sixth-grade children.

Vogel (1970) investigated sixth-grade students' attitudes of political efficacy. He found that students participating in a game entitled ***City Council*** displayed significantly more positive attitudes of political efficacy when compared to students who learned about city council work in a class using a conventional strategy of instruction. DeKock (1969) investigated the impact of a simulation game dealing with racial problems ***(Sunshine)*** on student racial attitudes. He developed a test to measure attitude change. The results of his study suggest that there was a positive change toward tolerance and acceptance of differences on the part of students who participated in the game. The generalizability of this study is limited, however, because no control groups were used for comparison.

Corbin (1971) conducted a study evaluating a simulation game about Southeast Asia and found it had little effect on the political, social, and economic attitude of ninth-grade students. A contrast to this study was one conducted by Boocock (1966) to test the effects of a computer election game on student interest and learning. She found that the exercise had no significant impact on the learning of factual materials by students, but students' attitudes toward politicians and political roles in society were altered in a positive direction.

Again it must be emphasized that most of these researchers drew conclusions from data obtained by instruments of their own devising and which were not validated or proven reliable. The research on attitudes leaves us in a paradoxical situation: It demonstrates the most promising research results to date, but most of the findings cannot be generalized beyond the situation that was investigated.

Summary of Research on Learning Games

Two major reviews (Cherryholmes, 1966; Fletcher, 1971) have been conducted on the research dealing with simulation and gaming in education. After criticizing the six available studies, Cherryholmes could only conclude that students participating in a learning game or simulation enjoyed such exercises more than conventional classroom activities. Research to that time did not reveal any other advantages for games and simulations over alternative teaching techniques or media.

The volume of research in the field has expanded considerably since Cherryholmes' article, yet the quality of the research available has not improved particularly. Fletcher (1971) was quite critical of the available research in the field. He cited four interrelated reasons why research in the field of games and simulations is still in its infancy stage: (1) there is a lack of standardized, workable games; (2) existing games vary enormously in objectives, structure, level of sophistication, subject matter, complexity of tasks, and variety of interactions required of participants; (3) most games are not adequate models of social reality; and (4) there is lack of agreement on appropriate administrative procedures when games are used for learning experiences.

Fletcher concluded that most research with games has been of a "shotgun" nature. The research has consisted predominately of single studies on particular games, each using its own battery of tests to measure different sets of dependent and independent variables. This practice may explain why there have been few attempts to replicate the findings of previous research. Replication may be impossible.

This review reaffirms these evaluations of the research. Most of the research which has been accomplished in the field is suspect because of inadequate testing procedures and research design, use of unsophisticated statistics, and inability to determine important variables.

What conclusions can be drawn about simulation games as teaching devices? First, they do not appear to have any clear advantage in teaching content to students. If content learning is the major instructional goal, then it appears that other activities and techniques such as lectures, programmed learning, reading, or intensive group practice in information gathering and recall may be equally or even more effective.

Second, games and simulations appear to have a positive influence on student attitudes. However, this may be due more to the novelty and quality of each exercise than any other factor. A boring game is just as educationally useless as a boring book or lecture.

Third, games and simulations appear to be influential in encouraging students to become more actively involved in the learning process. A teacher trying to involve students in learning can receive considerable aid from the available simulations and games.

Needed Information

Many people may be of the opinion expressed by Tansey (1973) that you cannot judge the worth of simulations and games with statistics and evaluations any more than you can judge the relative merits of Beethoven, Brahms, or Picasso. Games and simulations may have been oversold as an educational panacea. Some are very interesting exercises. Many are quite dull and superficial. None of them are of the quality of Picasso's, Beethoven's, or Brahms' work. But a stance which rejects the possibility of producing valid empirical data useful in judging an educational tool runs counter to the intellectual commitments of modern science.

No doubt, more research of better quality is needed, research which builds upon previous work done in the field and which is conducted in a systematic manner in a controlled setting. Both producers and consumers of games and simulations need more information about the effects of participating in such activities. A number of unanswered questions remain: Do females experience more or less success in these games than do males? What relationships do age, maturity, and grade level have to the participants' success with different types of exercises? What unique behaviors are observed when people participate in games and simulations which do not occur in other types of learning activities? Does the level of cognitive functioning among participants of a game or simulation change at various stages in the exercise? If so, why and when? Do students who are usually leaders in classroom activities also dominate game situations or do new leaders emerge? Do any of the answers to these questions change when a cooperative setting for the game is used instead of a competitive setting? Can simulations and games help teach students skills of critical thinking and problem solving?

It must be mentioned that much of the research available has probed convenient questions rather than questions important to users and developers. Consequently, most investigations have been too limited in scope. Any change or innovation in educational technique has some costs and benefits. Games may reduce student content learning (cost), but improve attitudes and stimulate independent learning behavior (benefits). Such tradeoffs should be investigated, but most research to date has been too narrowly focused to assist. Only one study (Wentworth, 1972) has tried to measure the broad impact of a simulation game. This study involved the measurement of attitudinal, cognitive, and behavioral variables, but it also needs replication and supportive research.

Finally, it must be recognized that paper and pencil tests may have limited measurement capabilities for investigations conducted on games and simulations. The purpose of any game or simulation is to place a student in an artificial environment, an environment he must learn to understand in order to be successful in it. Learning to cope with this new environment involves a process of learning. The participant is asked to observe the behaviors of others, decide on a course of action, learn from the consequences of an action, and change his behavior in accordance with what he or she has learned. It is extremely difficult for that "process" to be tested with a paper and pencil test given at the end of the experience. The "process" variables should be identified and investigated. Such variables may involve the level of hostility or acceptance found in the verbal behavior of participants, the level of thinking exhibited by participants, or the relationship of nonverbal behavior to other participant actions. Such information could help reveal what students do *when* they are learning. The weakness of paper and pencil tests is that they measure secondary data of a static nature. They tell us what students have learned. This past tense form of information tells us little about how the learning environment can be manipulated to maximize student achievement and understanding.

Many observation instruments are now available to test identifiable learning behaviors. Observation analysis instruments have excellent potential for providing investigators with reliable and important data on the effects of learning games and simulations. Using these instruments, researchers can measure social-emotional climate, hostility, level of thinking, verbal and nonverbal behavior, frequency of participant interaction, and a variety of other variables to use in evaluating the usefulness of instructional games and simulations.

In conclusion, it is the thesis of this article that most of the research conducted to date on games and simulations has obscured rather than clarified our knowledge about games and simulations. Research identifying behavioral variables and using more careful controls and more sensitive instruments must be conducted and replicated before the field of games and simulation research can move out of its infancy stage. Such research with a broader, more imaginative perspective would surely be of great value to everyone concerned with the use of games and simulations in the classroom.

REFERENCES

Allen, L. E., Allen, R. W., and Miller, J. C. Programmed games and the learning of problem solving skills: The WFF'N PROOF example. *The Journal of Educational Research*, 1966, *55*, 22-25.

Anderson, C. R. The Effectiveness of a Simulation Learning Game in Teaching Consumer Credit to Senior High School Students in Comparison to a Conventional Approach to Instruction. Unpublished doctoral dissertation, University of Maryland, 1969.

Baker, E. H. A Comparative Study of Textbook and Simulation Approaches in Teaching Junior High School American History. Unpublished doctoral dissertation, Northwestern University, 1966.

Boags, W. A Comparison of Affective Reaction and Cognitive Learning of Participants in a Simulation-Game Experience. Unpublished doctoral dissertation, Syracuse University, 1970.

Boocock, S. S. The Effects of Games with Simulated Environments Upon Student Learning. Unpublished doctoral dissertation, Johns Hopkins University, 1966.

Bowen, J. J. The Use of Games as an Instructional Media. Unpublished doctoral dissertation, University of California at Los Angeles, 1969.

Chartier, M. R. Learning effect: An experimental study of a simulation game and instrumented discussion. *Simulation and Games*, 1972, *3*, 203-217.

Cherryholmes, C. H. Some current research on effectiveness of educational simulations: Implications for alternative strategies. *The American Behavioral Scientist*, 1966, *10*, 4-7.

Clarke, W. A research note on simulation in the social studies. *Simulation and Games*, 1970, *1*, 203-210.

Cohen, K. C. *Effects of the CONSUMER GAME on Learning and Attitudes of Selected Seventh Grade Students in a Target-Area School*. Report No. 65. The Center for the Study of Social Organization of Schools, Johns Hopkins University, 1970.

Corbin, W. S. The Effects of a Simulation Game about S. E. Asia on Political, Economic and Social Attitudes of Ninth Grade Students. Unpublished doctoral dissertation, The University of Rochester, 1971.

Cordtz, W. W. A Simulation Methodology of Instruction in a College Course of American Studies. Unpublished doctoral dissertation, United States International University, 1969.

DeKock, P. Simulations and changes in racial attitudes. *Social Education*, 1969, *33*, 181-183.

Dooley, B. J. Research on the Market Game. In G. Dawson (Ed.) *Economic*

Education Experiences of Enterprising Teachers, Volume 5. New York: Joint Council on Economic Education, 1969.70.

Duke, R. D. Gaming—Simulation Studies in Urban Land Use Allocation. Unpublished doctoral dissertation, University of Michigan, 1964.

Emery, E. D. and Enger, T. P. Computer gaming and learning in an introductory economics course. *Journal of Economic Education*, 1972, *3*, 77-85.

Feldmiller, I. The Exploration of the Nature of Learning Experiences Using Simulation Games as Revealed by Verbal Behavior. Unpublished doctoral dissertation, Ohio State University, 1970.

Fletcher, J. L. Book review of Simulation Games in Learning by S. S. Boocock and E. O. Schild. *Simulation and Games*, 1970, *1*, 211-220.

Fletcher, J. L. The effectiveness of simulation games as learning environments: A proposed program of research. *Simulation and Games*, 1971, *2*, 473-488.

Fletcher, J. L. The Effects of Two Elementary School Social Studies Games: An Experimental Field Study. Unpublished doctoral dissertation, Harvard University, 1968.

Fletcher, J. L., and Dobbins, A. L. An Approach to Evaluating Learning in Simulation Games. Unpublished paper presented at AERA Annual Meeting, 1970.

Garvey, D. M. and Seiler, W. H. *A Study of Effectiveness of Different Methods of Teaching International Relations to High School Students* (Final Report Coopeative Research Project No. S-270). Emporia: Kansas State Teachers College, 1966.

Gross, R. E. A decade of doctoral research in social education. *Social Education*, 1972, *36*, 555-560.

Hart, W. K. An Analysis of the Usefulness of Simulation Games in Affecting Attitudinal Changes and Skill-Type Learning. Unpublished doctoral dissertation, United States International University, 1969.

Inbar, M. The Differential Impact of a Game Simulating a Community Disaster, and Its Implications for Games with Simulated Environments. Unpublished doctoral dissertation, Johns Hopkins University, 1966.

Lee, R. S. and O'Leary, A. Attitude and personality effects of a three-day simulation. *Simulation and Games*, 1971, *2*, 309-348.

Lewis, D. R. and Wentworth, D. *Games and Simulations for Teaching Economics.* New York: Joint Council on Economic Education, 1971.

Livingston, S. A. Effects of a legislative simulation game on the political attitudes of junior high school students. *Simulation and Games*, 1972, *3*, 41-51.

Livingston, S. A. *Simulation Games as Advanced Organizers in the Learning of Social Science Materials* (Report No. 64). The Center for the Study of Social Organization of Schools, Johns Hopkins University, 1970a.

Livingston, S. A. *Simulation Games and Attitude Changes: Attitudes Toward the Poor* (Report No. 63). The Center for the Study of Social Organization of Schools, Johns Hopkins University, 1970b.

Lloyd, J. W. Role playing, collective bargaining and the measurement of attitude change. *The Journal of Economic Education*, 1970, *1*, 104-110.

McFarlane, P. T. Racial and Social Class Differences in the Play of a Parent-Child Simulation Game. Unpublished doctoral dissertation, Johns Hopkins University, 1970.

McHenry, W. J. A Study of the Use of the LIFE CAREER GAME in Junior High School Group Guidance. Unpublished doctoral dissertation, George Washington University, 1969.

Monroe, M. W. Games as Teaching Tools: An Examination of the COMMUNITY LAND USE GAME. Unpublished master's thesis, Cornell University, 1968.

Mountain, M. H. Educational Games for Classroom Use. Unpublished doctoral dissertation, Pennsylvania State University, 1960.

Newfield, J. An Application of Gaming to Curriculum Instruction. Unpublished doctoral dissertation, University of New Mexico, 1969.

Riegel, T. K. A Comparative Study of Two Approaches to the Teaching of Economics in Suburban New Jersey Twelfth-Grade Economics Classrooms. Unpublished doctoral dissertation, New York University, 1969.

Robinson, J. A., Anderson, L. F., Hermann, M. G., and Snyder, R. C. Teaching with INTER-NATION SIMULATION and case studies. *The American Political Science Review*, 1966, *60*, 53-65.

Schild, E. O. The shaping of strategies. *The American Behavioral Scientist*, 1966, *10*, 104.

Shirts, R. G., and Sprague, H. T. *Exploring Classroom Uses of Simulations*. La Jolla, California: Western Behavioral Sciences Institute, 1966.

Stadsklev, R. A Comparative Study of Simulation Gaming and Lecture-Discussion Method. Unpublished master's thesis, University of Minnesota, 1969.

Stahl, A. F. Mode of presentation and subjects' affective reactions to the resolution of simulated problems. *Simulation and Games*, 1970, *1*, 263-279.

Tansey, P. J. Evaluation, statistics both slammed. *Simulation/Gaming/News*, 1973, *1*, 4.

Targ, H. R. Impacts of an Elementary School INTER-NATION SIMULATION on Developing Orientations to International Politics. Unpublished doctoral dissertation, Northwestern University, 1967.

Thompson, F. A. *Gaming via Computer Simulation Techniques for Junior College Economics Education* (Final Report NDEA Title III-B, Project No. 212-B-8060 J). Riverside, California: Riverside City College, 1968.

Vogel, R. W. The Effect of a Simulation Game on the Attitudes of Political Efficacy of Sixth-Grade Students. Unpublished master's thesis, University of Alberta, 1970.

Wentworth, D. R. The Effectiveness of a Learning Game for Teaching Introductory Economics in Selected Two-Year Colleges. Unpublished doctoral dissertation, University of Minnesota, 1972.

Wing, R. L. Two computer-based economics games for sixth graders. *The American Behavioral Scientist*, 1966, *10*, 31-33.

B. Identifying the References: A Survey of Research Completed in the Area of Social Science Simulations and Games

Allen, Layman E., Robert W. Allen and James C. Miller, "Programmed Games and the Learning of Problem Solving Skills: The WFF'N PROOF Example," *The Journal of Educational Research*, 55 (September 1966), 22-25.

This study examined whether learning a game like WFF'N PROOF aided in the development of more general problem-solving skills. The California Test of Mental Maturity was used as a pre- and postinstrument. As compared with a control group of junior high school students, the experimental group experienced a highly significant change in the mean, nonlanguage IQ score. A *t*-test analysis was the statistical technique employed. An analysis of differences between boys and girls indicated that virtually all of the main experimental differences were contributed by boys but that by simply retaking the test the girls changed almost as much as the boys changed from exposure to the logic games. This result could not be explained.

Anderson, Charles R., The Effectiveness of a Simulation Learning Game in Teaching Consumer Credit to Senior High School Students in Comparison to a Conventional Approach to Instruction. Doctoral Dissertation, University of Maryland, 1969.

This study experimentally tested whether a simulation learning game might be a more effective learning experience than conventional classroom approaches in communicating factual information. Student acquisition of some specifically defined behaviors that might be generalized to a comparable real-life situation were also tested. Scores and ratings between control and experimental groups were tested for significance by analysis of variance and covariance. No significant differences were found except that the simulation learning game was more effective with males. This study is also described in *Simulation and Games*, 1 (March 1970), 43-53.

Baker, Eugene H., A Comparative Study of Textbook and Simulation Approaches in Teaching Junior High School American History. Doctoral Dissertation, Northwestern University, 1966.

This study experimentally investigated any differences in cognition and attitudes as a result of employing simulation and conventional methods in teaching a junior high school American History course. Students were randomly assigned to two experimental and two control classes. They were both pre- and posttested with attitude and cognitive instruments. Employing analysis of variance and *t*-tests, the study indicated that there were significant differences in both cognitive performance and attitudinal change favoring the simulation classes.

Boags, William, A Comparison of Affective Reaction and Cognitive Learning of Participants in a Simulation-Game Experience. Doctoral Dissertation, Syracuse University, 1970.

This study attempted to examine change in selected affective factors which learners bring to a simulation game situation and to measure any relationship between affective orientation and cognitive learning in this setting. The study included 56 graduate students in social work education who were randomly assigned to two treatment groups: one group in a competitive setting, the other played a "solitary" version. The participants were pre- and posttested on course material and with the Moods Adjective Checklist. Statistical analysis showed a significant gain in achievement for all participants, but no significant difference in achievement between groups. However, subjects who participated in the individualized noncompetitive version of the game evidenced greater change in affective orientation than subjects who participated in competition with each other.

Boocock, Sarane S., Effects of an Election Campaign Game in Four High School Classes. Unpublished paper, Department of Social Relations, Johns Hopkins University, 1963.

This study utilized a man-computer election game in selected high school classes to determine whether participation in the game would improve student learning. The study indicated no significant effect on the learning of factual material by students. Student interest remained high, and student attitudes were altered toward politicians and political roles in society. Students tended to reflect a more realistic attitude toward politics after participating in the game.

Boocock, Sarane S., The Effects of Games with Simulated Environments Upon Student Learning. Doctoral Dissertation, Johns Hopkins University, 1966.

This study reviewed the problems of doing experimental research on new educational techniques in general and with simulation games in particular. Data from experiments with seven different games were examined. These studies provided empirical evidence of four general types of learning effects: (1) inducements to student motivation and learning; (2) vicarious experience; (3) intellectual learning; and (4) changes in student attitudes. There also existed evidence to suggest that performance in games is not related to performance on standardized tests. The results of this study are also reported in part in *The American Behavioral Scientist*, 10 (October 1966); *Sociology of Education*, 39 (Summer 1966); and in *Simulation Games in Learning*, edited by Sarane S. Boocock and E. O. Schild.

Bowen, James J., The Use of Games as an Instructional Media. Doctoral Dissertation, University of California, Los Angeles, 1969.

This study experimentally evaluated the cognitive effectiveness of the WFF'N PROOF game as an instructional medium exercise employed with fourth-grade honor students. The degree of proficiency in mathematical logic was determined by pre- and posttests which were specially constructed for this study. A *t*-test determined no significant difference.

Calkins, Ralph N., "A Computerized Model of Exchange as an Aid to

Teaching Price Theory," *The Journal of Economic Education*, 1 (Spring 1970), 97-103.

This study evaluated the effectiveness of a computer-assisted instructional model of exchange as an aid to teaching students in college economics. In a specially constructed test, postscores for the control group were significantly below those for the experimental group. Exposure to the computer model seemed to be the best explanation of the superior performance of the experimental group although there were other variables influencing the results.

Chartier, Myron Raymond, An Experimental Study of the Effect of a Simulation Game and Instrumented Discussion Upon the Learning Outcomes of Subjects. Doctoral Dissertation, University of Denver, 1971.

The purpose of this study was to investigate the effects of four educational methods involving various combinations of simulation and discussion upon the learning outcomes of subjects. The participants were randomly selected undergraduates from the introductory speech communication courses at the University of Denver. The subjects were systematically assigned to one of four experimental conditions: simulation with discussion, simulation without discussion, discussion without simulation, or individual study. At the completion of their exposure to one of the four experimental treatments the learning impact of the subjects' experience was measured through an achievement test and a Satisfaction in Response Rating Scale. It was found that subjects who participated in a simulation game with discussion will learn as much at the cognitive level as will subjects participating in simulation without discussion, discussion without simulation or independent study. However, subjects who participated in the simulation game with discussion expressed more satisfaction with learning than did subjects participating in simulation without discussion, discussion without simulation, or independent study.

Chartier, Myron R., "Learning Effect: An Experimental Study of a Simulation Game and Instrumented Discussion," *Simulation and Games*, 3 (June 1972), 203-217.

This study attempted to determine what affect linking discussion with simulation games had upon cognitive and affective learning outcomes. Six cognitive learning outcomes, ranging from simple to complex, were measured to determine the degree and type of knowledge learned. Attitude measures were used to quantify learning in the affective domain. Simple Analysis of Variance coupled with Duncan's New Multiple Range Test for unequally replicated means was used. The study indicated that the procedure of coupling simulations with discussion did not provide significant changes in content learning outcome but it did significantly affect affective learning.

Cherryholmes, Cleo H., "Some Current Research on Effectiveness of Educational Simulations: Implications for Alternative Strategies," *The American Behavioral Scientist*, 10 (October 1966), 4-7.

The author reviews six studies involved with testing the effectiveness of educational simulations. The review indicates that only one hypothesis was validated—i.e., students report more interest in simulation activities than in more conventional classroom exercises. Learning and attitude changes resulting from simulations may not be as great as claimed. The author suggests some alternative strategies for using educational simulations: (1) have students design or revise an educational simulation; (2) have students attempt to validate the theory of the game with real-life data.

Clegg, Blanche Edwards, The Effectiveness of Learning Games Used by Economically Disadvantaged Parents to Increase the Reading Achievement of their Children. Doctoral Dissertation, University of Washington, 1971.

This study investigated the effects of learning games used by economically disadvantaged parents to increase the reading achievement of their children. The games utilized planned dialogue imitating the middle-class school languages. The subjects for the experiment were 30 second-grade children from a predominantly black, low-socioeconomic district in the Seattle central area. The experimental design for the study was a randomized group, pretest-posttest, two-control group design. It was found that learning games used by economically disadvantaged parents increased the reading achievement and IQ scores of their children. In addition, the games provided useful tools for learning in the central area and were techniques for the school to involve the parent in the learning process.

Cohen, Karen C., *Effects of the "Consumer Game" on Learning and Attitudes of Selected Seventh Grade Students in a Target-Area School.* The Center for the Study of Social Organization of Schools, Johns Hopkins University, Report No. 65 (May 1970).

This study reports on the experimental use of the Consumer Game in a class of seventh-grade students in a "target-area" school. The students were not highly motivated and displayed poor attitudes toward school. Experimental and control groups were set up to teach the same material. Attitude questionnaires and tests of cognition were employed at the end of the game. Results indicated that the game effectively taught students concepts about consumer buying. The behavior and attendance of the students improved during the time they used the game.

Corbin, Warren Spencer, The Effects of a Simulation Game about Southeast Asia on Political, Economic, and Social Attitudes of Ninth Grade Students. Doctoral Dissertation, The University of Rochester, 1971.

The purpose of this study was to determine to what extent student attitudes about political, economic and social issues in the U.S. are affected by participation in a simulation game on Southeast Asia. A posttest-only control group design was used. The subjects were 210 ninth-grade students in an Asian and African culture studies course. The duration of the study was three weeks. At the conclusion of the experimental period both control and experimental groups were administered a 30-item attitude inventory developed by the investigator. Chi-square analysis was used to evaluate the data. No significant statistical differences were found.

Cordtz, William A., A Simulation Methodology of Instruction in a College Course of American Studies. Doctoral Dissertation, United States International University, 1969.

This study experimentally evaluated a simulation game as an entire course in American Studies at the college level. Employing t-tests of significance, the results indicated no significant differences in cognition. However, experimental students had significantly higher preferences for the course and content.

Dooley, B. J., "Research on the Market Game," in George Dawson, Editor, *Economic Education Experiences of Enterprising Teachers*, Volume 6, New York: Joint Council on Economic Education, 1969, p. 70.

This study compared performances between fourth-grade students taught with the Market Game, which was developed for use in the University of Chicago Elementary Economics Program, and fourth-grade students taught by a conventional lecture method. Although the adjusted mean score of the experimental group was higher, no significant differences in cognitive performance were found. However, more participation and enjoyment on the part of students using the game was observed.

Duke, Richard De La Barre, Gaming—Simulation Studies in Urban Land Use Allocation. Doctoral Dissertation, University of Michigan, 1964.

This research involved the design, development, testing and evaluation of a prototype game-simulation of a typical urban region (Metropolis). Part of this research involved testing senior undergraduates involved in urban planning. Students who played the game averaged an increase in knowledge of 35.9 percent as opposed to a control group which increased 6.3 percent. Based on data derived from experience with Metropolis and an evaluation of work performed by other researchers, eight universal criteria for evaluation of gaming-simulations are presented.

Emery, E. D., and T. P. Enger, "Computer Gaming and Learning in an Introductory Economics Course." *Journal of Economic Education*, 3 (1972), 77-85.

This article attempts to evaluate the three computer games Fiscal Policy —Attiyeh, Monetary Policy—Emery and Enger, and Gloom—Schmalensee and MacAvoy. The "hands on" access to a computer or terminal permitted each student to play the game(s) at his or her convenience. The computer played the role of providing immediate feedback pertaining to the student's decisions. The results of the effectiveness of these games are based upon pre- and posttest scores which tested simple application, complex application, and recognition understanding. Significant results were observed in performance when gaming was used as a technique of instruction as compared to customary teaching procedures.

Feldmiller, Ilanjean, The Exploration of the Nature of Learning Experiences Using Simulation Games as Revealed by Verbal Behavior. Doctoral Dissertation, Ohio State University, 1970.

This study identified the type of verbal behavior used by six groups of home economics teachers in a family planning simulation game (Choice and Change) and described how the verbal behavior changed as participants progressed in the game. Tape recorders were used to record their verbal behavior. Their questions and explanations were classified in groups relating to procedure, situation, concepts and real world.

Fletcher, Jerry L., The Effects of Two Elementary School Social Studies Games: An Experimental Field Study. Doctoral Dissertation, Harvard University, 1968.

> This study reviewed the many weaknesses of previous research reported in the area of educational games and simulations. The study also experimentally tested the mechanism of procedures by which elementary students learn from games. The feedback system and the apparent goal in the games were varied systematically across four experimental conditions. F-tests, *t*-tests, and Chi square tests were used in the statistical analysis. The results suggested that increasing the difficulty of the goal has only a marginal effect on student cognitive learning. Although reviewing the feedback from previous plays had a positive effect on student learning, it did not improve player performance in the game or choice of playing strategies. Boys usually out-performed girls in the game, and ability level made little difference in game performance. However, in independent cognitive tests girls learned just as much as boys and brighter students learned more than lower ability students.

Fletcher, J. L., "The Effectiveness of Simulation Games as Learning Environments: A Proposed Program of Research," *Simulation and Games*, 2 (1971), 425-454.

> This article presents the need for sound evaluative research in the area of games and simulations. Key problems in the structure of current game models are identified and discussed with evaluation in mind. A distinction is made between dependent and independent variables and a method of evaluation of process and content acquisition is discussed.

Fletcher, Jerry L., and Allen L. Dobbins, An Approach to Evaluating Learning in Simulation Games. Unpublished paper presented at the annual American Educational Research Association meeting, March 4, 1970.

> This study identified the ability to make accurate predictions as a key dependent variable in playing educational games. The study attempted to measure the impact of repeated plays with a specially constructed game on this ability. Experimental and control groups of secondary students were pre- and posttape-recorded and student responses were coded as to quality of prediction. Results indicated that the experimental group did significantly better in making accurate predictions.

Garvey, Dale M., and William H. Seiler, *A Study of Effectiveness of Different Methods of Teaching International Relations to High School Students* (Final Report Cooperative Research Project No. S-270). Emporia: Kansas State Teachers College, 1966.

> This study attempted to determine whether simulation produces greater acquisition and retention of factual and conceptual knowledge than do lecture-discussion techniques when used in the high school classroom. Eight twelfth-grade American Government classes were used for the study's sample population. Student attitudes were evaluated subjectively by the experimenters and cooperating teachers. No significant differences were found to support the hypotheses about learning.

Goodman, Robert, The *Inter-Community Simulation:* An Experiment in Simulation-Gaming. Doctoral Dissertation, University of California, Los Angeles, 1968.

This study examined the relative role responses of graduate students playing the *Inter-Community Simulation* exercise. The analysis focuses upon the relative influence of payoffs as determinants of behavior for the roles which players were assigned. The study indicated that content factors, such as jobs, often outweighed project payoffs. The study also presented evidence that persons who bargained by swapping were more effective in the game than those who utilized only persuasion. The analysis points to several shortcomings in the game.

Harpstrite, James Joseph, An Analysis of Selected Simulation Games and the Assessment of the Subjective Feelings of Students and Teachers Who Use Simulation Games in Social Studies Instruction. Doctoral Dissertation, Michigan State University, 1971.

This investigation attempts to assess the attitudes of teachers and students regarding the use of simulation games as a method of instruction. In this study simulation game techniques were compared to the lecture discussion format. Eight groups of students were randomly selected from eight high schools in Hawaii. Six of these groups were designated "experimental," the remaining two were the control. The control groups did not experience the simulation game technique—as did the experimental group—but were exposed solely to the lecture discussion technique.

The results indicate that both teachers and students held positive associations toward simulation games and negative associations toward the lecture discussion techniques. This negative association was also found in the control group which did not have the simulation game experience. Tests two months later presented the same phenomenon.

Hart, William K., An Analysis of the Usefulness of Simulation Games in Affecting Attitudinal Changes and Skill-Type Learning. Doctoral Dissertation, United States International University, 1969.

This study investigated the differences in polarization of attitudes and degree of cognitive learning between treatment and control groups of college students in political science, the former having been exposed to a simulation experience. Pre- and post-tests were given, using the semantic differential to test differences in responses to political concepts and course unit tests to measure cognition. The data generated were analyzed by covariance analysis, Chi square and *t*-tests. Results of the study indicated that there were no significant differences between groups in degree of polarization of attitudes, in degree of implied motivation, or in increased learning of cognitive material. Significant differences were found only in the direction of attitude polarization.

Inbar, Michael, The Differential Impact of a Game Simulating a Community Disaster, and Its Implications for Games with Simulated Environments. Doctoral Dissertation, Johns Hopkins University, 1966.

This study examined the reasons for the uneven enjoyment and learning usually exhibited by players who take part in games with simulated environments. Pre- and post-data were collected from 220 adolescents in 23 groups playing a game simulating a community disaster. Employing factor analysis, analysis of variance, and other statistical tests it was found that the players' predispositions and group size explained most of the differential impact of the game. This study is also reported in *The American Behavioral Scientist*, 10 (October 1966); and in *Simulation Games in Learning*, edited by Sarane S. Boocock and E. O. Schild.

Johnson, Richard H., Effect of the Life Career Game on Decision Making Variables at the Ninth Grade Level. Doctoral Dissertation, University of Missouri, 1970.

The purpose of this study was to investigate the effect of playing the *Life Career* game on 36 ninth-grade students' awareness of life decisions, exploratory activity, and time competency. Divided into three groups, one group played the *Life Career* game, another group played the *Life Career* game and engaged in related discussion, and the third group served as a control. At the end of four weeks, all subjects were given the Life Decisions Inventory and the Personal Orientation Inventory. The results indicated that playing the *Life Career* game, with or without discussion, has no effect on ninth-grade boys' or girls' awareness of life decisions, exploratory activity, or time competency.

Kelley, William H., The Development and Evaluation of an Educational Game to Teach Specific Aspects of Farm Management Decision Making to High School Vocational Agricultural Students. Doctoral Dissertation, Cornell University, 1969.

This study examined whether students might learn more specific information by playing a farm management game than if they did not play it; whether lower ability students who played the game would achieve higher scores than brighter students who did not play the game; and whether students participating in the game as a group would achieve better than students participating as individuals. The data were analyzed, using a multiple classification analysis of variance. No significant differences were found in the data.

Lee, R. S., and A. O'Leary. "Attitude and Personality Effects of a Three Day Simulation," *Simulation and Games*, 2 (September 1971), 309-348.

This study attempted to investigate, by means of a controlled experiment, the learning effects, as measured one month later, of a three-day version of the Inter-Nation Simulation. The participants in this experiment were high school seniors. The article identifies many positive assumptions regarding the use of games and simulations in the classroom, describes the experimental design used, presents actual observations and discussions, and supplies the reader with the results of the experiment. The results were numerous and varied. Generally this simulation generated a significant amount of reflective thought and taught process and personality characteristics to a high degree without having a detrimental effect on content.

Livingston, Samuel A., "Effects of a Legislative Simulation Game on the Political Attitudes of Junior High School Students," *Simulation and Games*, 3 (1972), 41-51.

This is the report of two investigations of the effects of the game Democracy on the political attitudes of junior high school students. The game focuses on the process of logrolling, which the players, assuming the role of congressmen, quickly discover to be the most effective way to satisfy their simulated constituencies. The testing instruments were designed by the investigator. The population used in the study were eighth and ninth-grade students from neighboring schools in Baltimore. The results indicated that students become more tolerant of congressional logrolling after playing the game. No evidence was found to indicate that students had improved feelings of political efficacy or that their interest in politics changed. Finally, no correlation was found between the changes in students' attitudes and their understanding of the game.

Livingston, Samuel A., *Simulation Games as Advanced Organizers in the Learning of Social Science Materials.* The Center for the Study of Social Organization of Schools, Johns Hopkins University, Report No. 64 (April 1970).

This study experimentally tested whether a simulation game would motivate students to learn subject matter related to the game and whether it would facilitate learning by acting as an organizer. Three secondary classes were selected, each with paired experimental and control groups. The game Trade and Develop was employed to teach concepts in economic geography only to the experimental groups. Both groups answered a questionnaire intended to measure motivation. A regular test was used to measure cognitive learning. The data were subjected to a *t*-test of means for significance. The results indicated no significant differences between the groups, in either motivation or learning, in any of the three experiments.

Livingston, Samuel A., *Simulation Games and Attitude Change: Attitudes Toward the Poor.* The Center for the Study of Social Organization of Schools, Johns Hopkins University, Report No. 63 (April 1970).

The effect of a simulation game (Ghetto) on player attitudes toward the poor was investigated by means of a pre- and postquestionnaire. No control group was used. Tests for cognitive learning and interests were also employed. Using *t*-tests for significance, the study revealed that student attitudes were significantly more favorable towards the poor after they played the game. The students' attitude change varied significantly from teacher to teacher, but was not significantly correlated with any of several other variables investigated. The game produced no change in factual information and a small, but significant, decline in interest in the subject matter.

Lloyd, John W., "Role Playing, Collective Bargaining and the Measurement of Attitude Change," *The Journal of Economic Education,* 1 (Spring 1970), 104-110.

This study examined whether attitudes are affected by role-playing in a collective bargaining simulation and whether any change in attitude is related to the role played. Students were given pre- and postquestionnaires on reactions to statements explaining labor-management conflict. Chi square statistical analysis was employed. The results were inconclusive.

Marston, Glenn F., Kenneth Lyon and Richard Knight, "Learning and Attitude Change of Students Subjected to a National Income Simulation Game," in Arthur L. Welsh, Editor, *Research Papers in Economic Education.* New

York: Joint Council on Economic Education, 1972, 159-170.

The authors of this article attempted through a systematic statistical procedure to evaluate the performance of a national income simulation model with respect to student achievement and interest. Two experiments took place, one on a college level, the other at a high school level. In both experiments control and experimental groups were used. The control groups experienced the same teaching process except for not taking part in the simulation experience.

The results indicated that the conventional teaching method supplemented by a national income simulation model is neither superior nor inferior to the conventional method as far as understanding of macroeconomics principles and interest in economics is concerned.

McFarlane, Paul T., Racial and Social Class Differences in the Play of a *Parent-Child Simulation Game.* Doctoral Dissertation, Johns Hopkins University, 1970.

This study attempted to determine the differential impact of playing a *Parent-Child Simulation Game.* Ninety-six fifth-grade male students were matched into experimental and control groups according to race and socioeconomic status. Using analysis of variance, no significant differences in student responses to questions about their perceptions of parental punitiveness were found.

McHenry, William J., A Study of the Use of the *Life Career* Game in Junior High School Group Guidance. Doctoral Dissertation, George Washington University, 1969.

The purposes of this study were (1) to test the differential effects on post-experimental self-referral to the counseling office of students exposed to the *Life Career* game, students exposed to the game of *Democracy* and students exposed to no systematic treatment; and (2) to compare the differential learning effects (as measured by pre- and post-tests) which occurred as a result of the *Life Career* game experience as opposed to the game of *Democracy* experience and the no-treatment group. The sample consisted of randomly selected seventh- and eighth-grade students ($n = 188$). There were no usable results on the self-referral hypothesis. Employing analysis of variance, no significant differences were found between groups at the seventh-grade level. However, a significant difference was found at the eighth-grade level, favoring the *Life Career* group.

McJulien, Wesley Joseph, The Effect of Modes of Presentation and Anxiety Levels on Individual Participant Achievement in an Educational Game. Doctoral Dissertation, Syracuse University, 1971.

The purpose of this study was to investigate the effects of modes of presentation (audiotape, videotape, written script) in an educational game upon the achievement of learners who have been classified as either high anxiety or low anxiety. Participants in the study were 120 college freshmen at Southern University. Subjects were identified as high or low anxiety using the IPAT Anxiety Scale Questionnaire and randomly assigned to one of the three treatment groups. The experimental design was of the posttest-only type. Data were analyzed by means of a parametric three-way analysis of variance. The game, *Propa-*

ganda, was adapted for use in the experiment. The analysis of data comparing the effectiveness of audiotape, videotape, and written-script modes of game presentation by anxiety and sex found no statistically significant differences among the treatment groups.

McKenney, James L., and William R. Dill, "Influences on Learning in Simulation Games." *The American Behavioral Scientist*, 10 (October 1966), 28-32.

This study measured and evaluated the relative performance of 650 business administration students in 21 teams playing a college-level management simulation. The study evaluated (1) student attitudes; (2) influence of faculty on student behavior; and (3) composition of student groups on team performance. The results indicated that (1) students did not perceive their goals well except for the groups attempting to concentrate on profit-making; (2) students did not evaluate their experience in depth; (3) teams experienced in simulation did not do better than inexperienced teams; (4) consulting by faculty was misunderstood and resented by students; (5) differences in ability influenced how well students played and understood the game.

Mountain, Mignonette H., Educational Games for Classroom Use. Doctoral Dissertation, Pennsylvania State University, 1960.

One hundred educational games were selected and sent (along with directions for playing, suggestions for classroom use, and an evaluation questionnaire) to 16 public school teachers who tested the games in their classrooms and evaluated them on the questionnaire. The data from the questionnaire were tabulated. As testified to by teachers, the results indicated that (1) educational games can serve as useful teaching aids in introducing and reinforcing knowledge, attitudes and skills in language arts, arithmetic and social science; (2) they can be used effectively in grades one through twelve; and (3) they can motivate the interests of students.

Monroe, Margaret Warne, Games as Teaching Tools: An Examination of the Community Land Use Game. Master's Thesis, Cornell University, 1968.

This study attempted to determine whether the simulation game Community Land Use Game (CLUG) would teach the same body of informational material as effectively as instruction by lecture-discussion techniques. Experimental and control groups were selected from volunteers. Pre- and posttests were designed by the course instructors. Total composite weighted scores were compared. Results indicated that the lectures were more effective in teaching theory and the game was more effective in teaching system dynamics.

Newfield, John, An Application of Gaming to Curriculum Instruction. Doctoral Dissertation, University of New Mexico, 1969.

This study compared the objective achievement of an experimental group of graduate students in a curriculum course which used a specially constructed game with that of a control group which did not. The instructional objective of the game was student awareness of the relationships among factors affecting curriculum and curriculum decisions. Nonparametric statistical methods were used to examine the poststudy test results. There were no significant differences between the scores of the two groups.

Pierfy, David Arthur, The Effects of a Simulation on the Learning of Geographic Information at the Fifth-Grade Level. Doctoral Dissertation, University of Georgia, 1972.

This investigation was a two-day experiment comparing the use of a simulation game to programmed learning technique to teach fifth-grade students geographic information. The students were randomly assigned to treatment groups. The posttest-only control group design was used. The programmed materials, simulation game, and measures of learning were all constructed by the investigator. Initially no significant differences between the groups were found in student knowledge of geographic information. After a two-week delay the same measuring instrument did show that students taught by the simulation game retained significantly more geographic information than students taught by the programmed materials. It was found that the game was most effective with male, high reading ability students. Lastly, students taught by the game reacted more favorably toward treatment than students taught by the programmed text.

Riegel, Terry K., A Comparative Study of Two Approaches to the Teaching of Economics in Suburban New Jersey Twelfth Grade Economics Classrooms. Doctoral Dissertation, New York University, 1969.

This study attempted to determine whether students completing a unit of instruction in economics with a simulation games series would score higher on cognitive tests and critical thinking tests than would students completing a parallel unit of instruction in economics with a lecture-discussion type of instruction. Eight twelfth-grade classes with four instructors, each teaching a control and experimental class, were used as the sample population. The simulation series used consisted of the Economic Decision Games, developed by Erwin Rausch and Science Research Associates. The tests employed were the Watson-Glaser Critical Thinking Appraisal, and "Stages of Economic Growth." Employing *t*-tests and analysis of covariance, no significant differences were found in content performance between the two groups. However, the experimental group had a significantly greater retention of critical thinking skills.

Robinson, James A., Lee F. Anderson, Margaret G. Hermann and Richard C. Snyder, "Teaching with Inter-Nation Simulation and Case Studies," *The American Political Science Review*, 60 (March 1966), 53-65.

This study compared the relative effectiveness of simulation and case studies as supplemental units of study for undergraduate political science students. Chi square and *t*-test statistical techniques were employed to analyze data on student attitudes, student behavior and cognitive learning. No significant differences were found, but some indirect complex relationships did exist and were identified.

Schild, E. O., "The Shaping of Strategies," *The American Behavioral Scientist*, 10 (November 1966), 1-4.

This study suggests that previous research in games and simulation has been inadequate because it measured the wrong variables. Most variables previously measured are unrelated to behaviors needed for winning. The researcher suggests that simulations shape student behavior by reinforcement (winning) and that this is how games should be evaluated—i.e., does the simulation set up contingencies which reinforce effective strategies? The study used four groups of secondary and college students playing the Parent-Child Game. By computing Gammas for each round in the game, the study found consistency from group to group in the type of strategy used by players to win the game. Conclusions indicated that the behavior of players was shaped by the structure and rules of the game, not other influences, and that strategies learned in one game transfer to another.

Shirts, R. Garry, and Hall T. Sprague, *Exploring Classroom Uses of Simulations*. La Jolla, Cal.: Western Behavioral Sciences Institute, 1966.

The Western Behavioral Sciences Institute conducted a number of classroom simulation techniques in San Diego County with selected junior and senior high school social studies classes. The simulations used were Inter-Nation Simulation, PLANS, NAPOLI and BMG. The purposes of the study were (1) to determine if simulations would fit within the time, space, and administrative and curriculum constraints of schools; and (2) to develop hypotheses about the use, effects and potentiality of simulations in school systems. Student responses to a questionnaire, staff observations and teacher interviews were analyzed. Some student responses were analyzed for significance by Chi square analysis, although no control groups were used. It was concluded that simulations are feasible and potentially important means to help students become active, interested learners.

Smeda, Ralph, The Effect of a Simulation Game on the Vocational Maturity of Sixth Grade Students. Doctoral Dissertation, University of Rochester, 1972.

The purpose of this study was to examine the effect of a simulation game of a work environment upon the vocational maturity of sixth-grade students. A posttest-only control design was used. Sixty-six sixth-grade students participated in the study. The recorded I.Q. scores from the Otis-Lennon Mental Ability Test were used to divide the total group into two subgroups according to the median I.Q. score. Within each I.Q. level students were randomly assigned to experimental and control groups. The experimental group played the game Tour of the Plant while the control group played Tangrams, a geometric puzzle game. The experiment lasted for a period of 15 hours, spanning a time period of two weeks. The Vocational Development Inventory was administered one month after the experiment's completion to determine the effects of the experience. No significant differences were found between the experimental and control groups' vocational maturity. Significant differences were found between the vocational maturity of high I.Q. students and low I.Q. students.

Stadsklev, Ronald, A Comparative Study of Simulation Gaming and Lecture-Discussion Method. Master's Thesis, University of Minnesota, 1969.

This study experimentally compared simulation and lecture-discussion techniques for studying the U.S. Constitution in a tenth-grade American History course. Both experimental and control groups were pre- and posttested for cognitive gains and attitude changes. Students were not randomly selected for the study, rather the researcher matched the two populations with regard to IQ scores and GPA rankings. A *t*-test analysis indicated that cognitive gains in mean scores produced no significant differences. The study did find a significant gain in favorable student attitudes for the experimental group.

Stahl, Albert F., "Mode of Presentation and Subjects' Affective Reactions to the Resolution of Simulated Problems," *Simulation and Games*, 1 (September 1970), 263-279.

This study attempted to learn how student affective reactions to a simulation might be affected by the mode of presentation of the simulation. The Moodes Adjective Checklist (MACL) was used as a measure of change. The statistical analysis used analysis of variance and Mann-Whitney U Tests. The study indicated that the mode of presentation does affect student attitudes.

Starbuck, William H., and Ernest Kolrow, "The Effects of Advisors on Business Game Teams," *The American Behavioral Scientist*, 10 (November 1966), 28-30.

This study tested the consequences of adding advisors to teams of graduate students playing the UCLA Executive Decision Game. Profit was used as a criterion for measuring the results of decisions in the business game. Employing a *t*-test analysis, no significant differences were found in performances between the control and experimental groups. A regression analysis was used to test the effect of time on performance. The results suggested that the game might not have been played long enough for the superiority of the experimental group to become evident. The advisors had little success in making the game a laboratory for sophisticated decision models, but they found the game an excellent medium for reteaching fundamental concepts and for uncovering and correcting gaps in basic understandings. It was also found that the imposition of advisors did reduce the degree of perceived friendliness in the teams' interpersonal relations.

Stasulat, Joe J., The Effects of Business Game Complexity and Computer Location on Student Learning, Occupational Interest, and Attitude. Doctoral Dissertation, Pennsylvania State University, 1970.

The purpose of this study was to evaluate effects of business game complexity and computer location on student learning, occupational interest and attitude. The Purdue Farm Supply Business Management Game was used as the basic simulation model. The criterion measures included a management achievement test, the Hamilton and Hill Agricultural Occupational Interest Scale, and a semantic differential to measure student attitudes toward ten selected concepts. The major statistical procedure was analysis of covariance. Findings of the study indicate that when used as a teaching tool, the complexity of the business game used and the location of the computer facilities which process the simulation data result in no differences in student learning of occupational interest.

Targ, Harry R., Impacts of an Elementary School Inter-Nation Simulation on Developing Orientations to International Politics. Doctoral Dissertation, Northwestern University, 1967.

This study examined the developments in children's orientations to national foreign policy-making and international politics and the impact of an elementary school version of the Inter-Nation Simulation on these orientations. The political orientations examined included beliefs, evaluations, expectations and action preference about nations, foreign policy-making and international politics. The research was carried out with experimental and control groups from fourth, fifth, and sixth-grade classes. Employing Gamma and Chi square statistics, the results indicated that the simulation exercise significantly affected national and international beliefs and that its effect was inversely related to grade level.

Thompson, Fred A., *Gaming via Computer Simulation Techniques for Junior College Economics Education* (Final Report NDEA Title III-B, Project No. 212-B-8060 J). Riverside, Cal.: Riverside City College, 1968.

This study examined the effect of using gaming instructional techniques via computer versus conventional instruction in teaching economics at the junior college level. With experimental and control groups, Z score analysis of means found no significant differences in student learning and no significant differences in residual impact after five weeks. Multiple regression analysis was also employed to determine whether computer simulation techniques influenced student performance over the entire course. It was not found to be significant.

Wentworth, Donald R., The Effectiveness of a Learning Game for Teaching Introductory Economics in Selected Two-Year Colleges. Doctoral Dissertation, University of Minnesota, 1972.

This study attempted to measure the influence of a commercially available game, Marketplace, on student achievement in economic understanding, student attitudes toward the instructional process and selected economic concepts, and teacher-student behaviors in the classroom. The data were collected from a total of 149 students taking their first course in economics at two junior colleges. Students were randomly assigned to experimental and control classes with common instructors. The measuring instruments used were the Test of Understanding in College Economics, the Semantic Differential Attitude Scale, the Reciprocal Category System, and the Equivalent Category System. Results from the use of regression models, factor analysis, and behavior observation analysis revealed that students in the experimental class achieved significantly less understanding in college economics, demonstrated no difference in attitudes toward learning, and exhibited no significantly different learning behaviors than did the control group with the exception of the actual time devoted to playing the Marketplace game. During game play the affective climate of the class became more positive and student involvement in the learning process was more active but there was little or no carryover in this behavior to the classroom activities after the game playing had concluded.

Wing, Richard L., "Two Computer-Based Economics Games for Sixth Graders," *The American Behavioral Scientist*, 10 (November 1966), 31-33.

This study experimentally examined whether individualized computer learning games in economics could be played by sixth-grade students and how this exercise compared to conventional teaching techniques in learning effectiveness. Two experimental groups and one control group were pre- and posttested with the "Test of Economic Understanding Based on Ancient Sumer" and the "Test of Economic Principles Based on Sierra Leone." They were also given a retention test several weeks after the posttest. Employing *t*-tests, it was found that sixth-grade students could use and understand the computer games without difficulty. Interest among students was quite high. Although no significant differences were found in the amount of learning which took place between the experimental and control groups, it was found that students in the experimental group attained approximately the same amount of learning with considerably less investment of time.

CHAPTER III

Annotated Listing of Available Simulations and Games for the Teaching of Economics

Chapter III is devoted to a complete annotated, alphabetized listing of noncomputer-based games and simulations currently available for teaching economics. Along with a brief description of the game the teacher will also find data pertaining to the game's distributor, cost, subject area, suggested level, participant limits and playing time.

For most effective use of the game information provided, the teacher should first read Part C in Chapter I, "Selecting a Simulation Game for Teaching: Questions and Criteria." The selection criteria outlined in Chapter I, Part C provided the basis for information given on each game in this chapter. After selecting a game, the teacher will find the distributor's complete address in Chapter IV under "Names and Addresses of Distributors and Publishers."

It is worth noting that the games listed in this chapter do not include all the economic games produced over the last decade. Only publishers who responded to letters of inquiry have their games listed here. Given this criteria for listing, the teacher can be relatively sure that the game he or she selects is readily available.

Game: BALANCE
Source: Interact
Subject: Ecology, economic goals and decisions
Grade level: Senior high school
Playing time: 30 hours
No. of participants: 20-30
Cost: $10

The first hour simulates the last 150 years of U.S. history. Fifteen participants are animals; four are Indians; the rest are settlers who dominate and kill animals, fight Indians, and subdue the wilderness until their population soars to over 100,000. Participants are then divided into families of four members each living in Ecopolis, a city with many ecological problems. Interviewing parents and adults plus reading about pollution culminate in confrontations over what social action to pursue. Before an essay evaluation ends the game, participants conduct an ecological survey of their community and hold a one-hour forum in which they argue about the ecological balance of their own environment.

Game: BALDICER
Source: John Knox Press

Subject: World economy
Grade level: Senior high school
Playing time: 2-4 hours
No. of participants: 10-20
Cost: $25

The objective of this simulation game is to experience the interdependence of the world economy. The participants also gain increased awareness of related issues such as the population explosion, inflation, unequal distribution of resources and technology, and competing styles of economic organization.

Game: BALPAY
Source: Digital Equipment Corporation
Subject: Balance of trade
Grade level: Junior-senior high school
Playing time: One-half to 2 hours
No. of participants: 2-10
Cost: Individual packet $2.10; classroom packet $14

This computer-assisted game simulates the United States balance of trade payments: contributing trade factors are manipulated to present relationships.

Game: BANKING
Source: Didactic Systems, Inc.
Subject: Economics, banking
Grade level: Senior high school
Playing time: 2-5 hours
No. of participants: Teams of 6
Cost: $12 for 30 participants + teacher's guide $3.50

Through simulation and role-playing, participants in the game have a chance to observe, analyze and solve problems in a specific field of the economy. The game involves the financial activities and decisions of commercial banks. It serves to illustrate that a bank is both a profit maximizer and an influential factor in stimulating business and encouraging local economic development through its transactions.

Game: BAZAAR, A Simulation of Barter and Monetization
Source: American Universities Field Staff
Subject: Barter and monetization in a subsistence economy
Grade level: Senior high school-college
Playing time: One class period minimum. Can be extended with increasing sophistication among traders to five class periods
No. of participants: 3 or more (Individuals play on one of three teams.)
Cost: $49.00 includes this and another simulation (PILGRIMAGE) and more than 60 supporting culture study materials comprising a unit of study

Participants role-play farmers, nomads and shopkeepers in Aq Kupruk; the microeconomy of a town in northern Afghanistan. Subsistence living is presented in a context typical of the dry-land people of Afro-Eurasia.

Game: BLACKS AND WHITES
Source: Dynamic Design Industries

Subject: Economic equality
Grade level: Junior-senior high school
Playing time: 1-2 hours
No. of participants: 4-20
Cost: $6.95 plus shipping and handling

This game places the participants within a ghetto environment. It shows how the ghetto can be both a place and a state of mind. Welfare and housing issues are also presented in this game.

Game: BLIGHT
Source: Instructional Simulations, Inc.
Subject: Urban studies
Grade level: Junior, senior high school-college
Playing time: 3-8 hours
No. of participants: 20-40
Cost: $42.50 plus shipping

Blight explores the social dimensions of community decline. It deals with the sectors, problems, values and issues that both prompt change and inhibit community renewal.

Game: THE BLUE WODGET CO.
Source: Reese, Jay
Subject: Business structure
Grade level: Elementary-junior high school
Playing time: 2-4 hours
No. of participants: 20
Cost: $5

In this role-play simulation the participants become stockholders, managers and personnel of a manufacturing concern. They must contend with other participants who represent concerned citizens in the community.

Game: BUDGET
Source: Interact
Subject: National budget
Grade level: Junior-senior high school
Playing time: 2-4 hours
No. of participants: 40
Cost: $10

This role-play simulation allows participants to research specific "budgeted" agencies in the federal government and attempt to reach consensus on a budget for the country. Special interests force compromise and negotiation.

Game: BUDGETING GAME
Source: Changing Times Education Service
Subject: Consumer economics
Grade level: Junior-senior high school
Playing time: 2-4 hours
No. of Participants: Teams of 4
Cost: Contained in a consumer education unit, $24.50

Participants simulate a middle-income family of four earning $10,000. They must decide how to spend their money over a twelve-month period. The objective is to keep family spending equal to or less than the budget allotment. In this way participants learn that families make different choices about spending and saving, depending on their way of living, their needs and wants, their interests, likes and dislikes, hobbies and family goals.

Game: BUDGETS AND TAXES
Source: Education Ventures, Inc.
Subject: Community decisions
Grade level: Junior-senior high school
Playing time: 4-6 hours
No. of participants: 6-20
Cost: $4.95

Participants find themselves first in the roles of Riverdale's public officials, submitting budget requests for the year—then in the roles of private citizens who are affected by increases or cutbacks in services and taxes. Participants can increase spending in various departments without raising taxes as long as they can convince other departments to decrease spending. If that isn't possible taxes must go up. The goal is to give the community the kinds of services and programs that people are willing to pay for with their tax dollars.

Game: CAPITAL
Source: Berkeley Gaming Project
Subject: Nineteenth-century economy
Grade level: Senior high school-college
Playing time: 3-8 hours
No. of participants: 22-44
Cost: $20

Labor relations, production, marketing and government regulations in a nineteenth-century economy. Roles include laborers, middlemen, industrialists and government officials. Once subsistence is assured, participants may choose to optimize wealth or power or promote their conception of an ideal social order.

Game: CAREERS
Source: Parker Brothers Games
Subject: Occupations
Grade level: Elementary-junior and senior high school
Playing time: One-half to 2 hours
No. of participants: 2-6
Cost: $4.74

Careers gives participants a preview of the working world. Players choose from eight up-to-date occupations, setting their own success goals. There are rewards, promotions, setbacks and decision-making actions as they meet realistic challenges, trying to attain fame, fortune and happiness.

Game: CARIBOU HUNTING
Source: Curriculum Development Associates, Inc.

Subject: Culture and resource use
Grade level: Elementary
Playing time: 1-2 hours
No. of participants: 6-30
Cost: $325 (This is a total curriculum for 30 participants of which "Caribou Hunting" is a component.) Films are also available in 8 mm or 16 mm

Caribou Hunting allows participants to explore relationships between technology, social organizations and culture. Participants accept the role of Netsilik Eskimos of Pelly Bay and attempt to resolve the cultural and economic problem of how best to kill enough caribou to survive the winter.

Game: CENTER CITY
Source: John Knox Press
Subject: Urban poverty
Grade level: Junior high school
Playing time: 2-3 hours
No. of participants: 12-27
Cost: $15

Center City helps the participants experience what it's like to be poor in a large city. As junior high age residents they spend time in such areas as home, school, community, church, extracurricular activities and the streets. Maximum points are earned when participants unite across ethnic lines to overcome inadequate housing, food, recreation, and safety conditions.

Game: CHARGE
Source: Paul S. Amidon & Associates, Inc.
Subject: Charge accounts
Grade level: Senior high school
Playing time: 2-3 hours
No. of participants: 10
Cost: $15

This role-playing simulation allows participants to purchase goods and services during a simulated twelve-month period. The computer assigns positive and negative unexpected events.

Game: THE CITIES GAME
Source: Dynamic Design Industries
Subject: Urban affairs
Grade level: Senior high school
Playing time: 1-3 hours
No. of participants: 4-8
Cost: $6.95 plus shipping and handling

This is a game of negotiations. There are four power roles—business, government, slum dwellers and agitators. The object of the game is to acquire as much money and power as possible. This is done by collecting "rewards" from the game treasury or by negotiating "side payments" from other participants. The winner is the participant with the most money at the end of the game. The game ends after ten voting periods or when the Future City is reached.

Game: CLUG
Source: Urbex Affiliates, Inc.
Subject: Community land use
Grade level: Senior high school
Playing time: 3-20 hours
No. of participants: 5-25
Cost: $75 plus postage

The Community Land Use Game (CLUG) is a board game which abstracts a small number of basic attributes of cities and their surrounding territories on the basis of which players build, operate and maintain their own community. Play of CLUG begins with each of three to five teams in possession of capital with which they seek to buy land, to construct commercial or residential properties and to make profitable investments. Investment opportunities arise through gaining employment for residential properties, hiring employees to put industries into operation, or gaining customers for service establishments from among the community's residential units.

Game: COLLECTIVE BARGAINING
Source: Didactic Systems, Inc.
Subject: Economics, collective bargaining
Grade level: Senior high school-college
Playing time: 2-5 hours
No. of participants: Teams of 6
Cost: $12 for 30 participants plus teacher's guide $3.50

Collective Bargaining introduces participants to a crucial phase of labor-management relations. It is a model that allows participants to simulate the atmosphere and conditions that prevail during the negotiations of a new labor contract.

Game: COMMUNITY
Source: Didactic Systems, Inc.
Subject: Economics, community affairs
Grade level: Senior high school
Playing time: 2-5 hours
No. of participants: Teams of 6
Cost: $12 for 30 participants plus teacher's guide $3.50

Through the use of a model, this game helps participants to become aware of some of the economic principles and problems involved in running a community, the relationships between wages and profits generated by local industry, and the tax-expenditure problems of local government. The objective of the game is to create the most attractive, progressive community possible. Participants measure success by the number of improvements in the community, by wage rates and by the prosperity of local industry. The game is intended to acquaint participants with the public sector of the economy and illustrate the basic problems of selecting and financing public services.

Game: COMPACTS
Source: Gamed Simulations Incorporated
Subject: Community planning
Grade level: Senior high school-college

Playing time: 3-20 hours
No. of participants: 20-60
Cost: $75

Participants assume roles of planners, agency directors, community influentials, consumers and funders. Responding to a variety of issues (e.g., needs of retarded children, public housing, corrections services, etc.) they must decide whether or not to develop new services or maintain existing ones.

Game: **COMPETITION OR CONTROL?**
Source: South-Western Publishing Co., Inc.
Subject: Price regulation
Grade level: Junior-senior high school
Playing time: 1 hour
No. of participants: Up to 42
Cost: Part of a set of five economic simulations, $38.00 per set. A teacher's guide accompanies the set. (See other South-Western entries.)

Within most communities of the United States, apartment rentals are handled on a competitive basis without rent controls. In some areas, however, rental properties may be rent controlled. In this game a comparison is made between tenants seeking similar rental apartments in a free competitive market and those seeking rental units in rent-controlled housing and public housing. The main objective of this game is to familiarize the participant with the role government plays in certain rent markets to protect the consumer.

Game: **COMPETITION OR SUBSIDY?**
Source: South-Western Publishing Co., Inc.
Subject: The market
Grade level: Junior-senior high school
Playing time: 1 hour
No. of participants: Up to 42
Cost: Part of a set of five economic simulations, $38.00 per set. A teacher's guide accompanies the set. (See other South-Western entries.)

This game introduces the participant to the free competitive market in which items are bought and sold from a company in competition with many other companies. They are also exposed to economic conditions in which the government will offer a subsidy. This game uses peanuts as the commodity.

Game: **COMPETITIVE EXCHANGE MARKET**
Source: South-Western Publishing Co., Inc.
Subject: Stock market
Grade level: Junior-senior high school
Playing time: 1 hour
No. of participants: Up to 42
Cost: Part of a set of five economic simulations, $38.00 per set. A teacher's guide accompanies the set. (See other South-Western entries.)

This game acquaints participants with the buying and selling of common stock on the stock market. Participants learn about the stock exchange which trades corporate securities. They are introduced to terminology such as broker, stockholder, dividend and stock certificate. Participants learn how changing financial conditions induce some shareholders of a given company to sell their stock. These same conditions induce other persons to buy stock. In this game, common stock of the DC TRAN A COMPANY is bought and sold.

Game: CONSUMER
Source: Bobbs Merrill Co.
Subject: Consumer education
Grade level: Senior high school
Playing time: 2-4 hours
No. of participants: 11-34
Cost: $30

Consumer is a unit on consumer buying processes. It involves the players in the problems and economics of instalment buying. The purpose of the exercise is to teach students how to calculate true interest rates, how to negotiate contracts with credit managers, and the problems and economics of budgeting and buying. Participants assume the roles of consumers, credit agents and store owners. Consumers compete to get maximum pleasure from their purchase and minimum credit charges; credit agents compete for the best terms to the most people. Decisions must be made on what, whether, and when to buy goods; whether and when to use credit; creditors must decide to whom and under what terms to give credit. (This is also available as a computer game which can only be played by one person at a time. Special arrangements must be made with BOCES).

Game: CONSUMER REDRESS
Source: Changing Times Education Service
Subject: Consumer rights
Grade level: Junior-senior high school
Playing time: Game is part of total unit. Time depends on amount of material used.
No. of participants: 30
Cost: $64.50 for a total consumer law kit in which the game is a small part.

This game allows participants to identify consumer rights in the marketplace, the right to safety, the right to choose and the right to be heard. It also presents responsibilities related to these rights and issues involved in consumer law.

Game: THE CREDIT GAME
Source: Leswing Communications
Subject: Credit
Grade level: Elementary
Playing time: One-half to 1 hour
No. of participants: 8
Cost: $6.95

The participants use credit to obtain their wants and needs. Good judgment is needed not to overspend and to be able to pay the bills.

Game: **CRISIS**
Source: Simile II
Subject: International political and economic relations
Grade level: Junior-senior high school
Playing time: 2-6 hours
No. of participants: 25-35
Cost: $35 for 25-student kit, $50 for 35-student kits

The purpose of Crisis is to teach participants the balance of power concept and the dangers and rewards of seeking military and peaceful solutions to international problems. Participants assume the roles of nations faced with the problem of resolving a tense situation and guarding national interests concerning a mining area of enormous importance to the world. They must develop negotiation strategies and decide whether or not to go to war. Their objectives are to secure Dermatium (the element in the mines), to prevent destruction of their nations by war, and to secure world peace.

Game: **CULTURE CONTACT**
Source: Games Central
Subject: Culture conflicts in trade
Grade level: Junior-senior high school
Playing time: 2-4 hours
No. of participants: 20-30
Cost: $30

This is a role-playing simulation which brings out misunderstandings and cultural conflicts when a trading expedition calls at an island inhabited by a preindustrial society.

Game: **DANGEROUS PARALLEL**
Source: Scott, Foresman and Company
Subject: International relations
Grade level: Senior high school
Playing time: Six 40-minute sessions
No. of participants: 18-36
Cost: $60

Dangerous Parallel presents a model of a real-world situation in which a conflict threatens the peace of many nations. Students take roles of top-level decision-makers, walking through the closed doors of national conference rooms and into the secret sessions of international negotiations. Throughout, they are required to gather facts, weigh values, analyze problems and make decisions.

Game: **DEVELOPING NATION**
Source: American Universities Field Staff
Subject: Economic development
Grade level: Senior high school-college
Playing time: Up to one class period per group of players
No. of participants: 2-4
Cost: $49.00 includes this and three other simulation/games and supporting culture study materials comprising a unit of study on Southeast Asia

Participants role-play leaders in the developing nations of Southeast Asia. A board is provided. Players move along the board experiencing events which negatively or positively affect their progress toward the "Developed Nation" state.

Game: DIG
Source: Interact
Subject: Economic development
Grade level: Junior-senior high school
Playing time: 1-4 hours
No. of participants: 10-20
Cost: $10

Divided into two competing teams with the task of secretly creating two cultures, each team in the class first writes a description of its hypothetical civilization. This description stresses the interrelationship of cultural patterns: economics, government, family, language, religion and recreation. After designing and then constructing artifacts which reflect their civilization's cultural patterns, team members carefully place these artifacts in the ground, according to the archeological principles learned during the simulation. Then each team scientifically excavates, restores, analyzes and reconstructs the other team's artifacts and culture.

Game: DIRTY WATER
Source: Damon/Educational Division
Subject: Water pollution, ecology
Grade level: Elementary, junior and senior high school
Playing time: 1-3 hours
No. of participants: 2-4
Cost: $10

In this game each participant assumes the role of a water pollution control official who is responsible for stocking his lake. He does so by collecting appropriate organisms as he moves around the game board, confronting the problems of water pollution each time he lands on a "pollution" triangle. The participant must learn to anticipate possible pollution of his lake, attempt to avoid the problem of overpopulation, manage his finances efficiently, and consider the problem of possible pollution coming from upstream. A participant wins the game by controlling the pollution and thereby being the first to completely stock his lake. The purpose is to teach ecology, the problems of water pollution, and the complexity of the decision-making process.

Game: ECOLOGY
Source: Damon/Educational Division
Subject: Ecology
Grade level: Elementary, junior and senior high school
Playing time: 1-3 hours
No. of participants: 2-4
Cost: $10

This game allows players to begin the world over again. They must guide the human population through four stages of mankind's development: hunting, agricultural, industrial and environmental. Each participant must attempt to bring his population, his technology and his natural environment into a workable balance.

Game: ECON/GNP
Source: Digital Equipment Corporation
Subject: U.S. economy
Grade level: Junior-senior high school
Playing time: 1-2 hours
No. of participants: 2-10
Cost: Individual packet $2.10; classroom packet $14

This computer-assisted game simulates the United States economy. Decisions are made which affect the productive capacity of the country.

Game: ECONOMIC SYSTEM
Source: Bobbs Merrill Co.
Subject: Competitive economic system
Grade level: Junior-senior high school
Playing time: 2-6 hours
No. of participants: 7-13
Cost: $25

Economic System is based on the interrelationship of a competitive economic system. Mine owners, manufacturers, workers and farmers produce, market and consume goods while trying to make a profit and maintain a high standard of living. The game attempts to provide a graphic illustration of concepts relating to the operation of economic systems, including the dependence of each part of the system on the activities of other parts; ways in which group demands can cause the individual to modify his behavior; and how participants can use their power to see to it that their own interests play a role in any group demands and collective goals that may be formulated. Participants can also learn about the problems of international trade, the problems of taxation and the provision of public goods.

Game: EDPLAN
Source: Games Central
Subject: Educational planning, costs and benefits
Grade level: Senior high school
Playing time: 2-4 hours
No. of participants: 29-36
Cost: $25

Edplan is an educational system planning game designed to demonstrate the major issues of educational planning and to encourage awareness of alternative plans, costs and benefits.

Game: EL BARRIO
Source: Berkeley Gaming Project
Subject: Immigrant economic mobility
Grade level: Senior high school-college
Playing time: 2-3 hours
No. of participants: 7-15
Cost: $15

This game embodies the forces affecting a Latin immigrant to the big city in North America. He must acquire a physical skill, build a social network, learn how to use a vehicle, and decide whether to collaborate with the system or fight it. Participants may aim to become leaders in the Latin community, join the system and graduate to the suburbs, or move up and out still contesting.

Game: ELECTION
Source: Educational Games Company
Subject: Political careers
Grade level: Elementary-senior high school
Playing time: One-half to 1 hour
No. of participants: 4
Cost: $5.95

The purpose of this game is to inform the participants of the fundamentals of government service, the elective system, and the mechanics of the election of the President of the United States. Participants seek a career in government service—then seek the presidency.

Game: ENTERPRISE
Source: Interact
Subject: Free enterprise
Grade level: Junior-senior high school
Playing time: 2-4 hours
No. of participants: 20-30
Cost: $10

This role-play simulation places the participants into positions as bankers, businessmen, brokers, consumers, welfare poor, politicians and lobbyists. These groups interact with one another, buying and selling labor; buying and selling capital; and generally engaging in all the economic activities capitalism requires in order to function.

Game: ESSO SERVICE STATION GAME
Source: CRAC
Subject: Competition in the market
Grade level: Senior high school-college
Playing time: Open—up to ten 1-hour sessions
No. of participants: 30
Cost: 10 pounds (plus 75 pence postage)

The ESSO Service Station Game allots each team a service station with varying facilities. The teams then compete with each other for a greater market share of gasoline sales, car servicing and sales of tires, batteries and accessories.

Game: ESSO STUDENTS BUSINESS GAME
Source: CRAC
Subject: Financing
Grade level: Senior high school-college
Playing time: Open—up to ten 1-hour sessions
No. of participants: 30
Cost: 10 pounds (plus 75 pence postage)

The players in this game experience the complexities of financing a company which manufactures and markets refrigeration equipment. Decisions must be made in the finance, production and marketing areas.

Game: **FARMING**
Source: The Macmillan Company
Subject: Agriculture
Grade level: Senior high school
Playing time: 4-6 hours
No. of participants: 15-30
Cost: $91.95

The purpose of this simulation is to expose participants to some of the factors affecting farmers' decision-making. Participants assume the role of a farmer in western Kansas at three different time periods. They must decide what to produce, what products to invest in, and what products to reinvest in. The implication is that participants will learn from the results of their decisions and change their decisions to best achieve the maximum production, given the agricultural conditions in Kansas. This simulation is part of the national High School Geography Project.

Game: **FIRM**
Source: Didactic Systems, Inc.
Subject: Business management
Grade level: Senior high school-college
Playing time: 2-4 hours
No. of participants: Teams of 6
Cost: $12 for 30 participants plus teacher's guide $3.50

The purpose of this exercise is to teach the economic principles of running a firm, and the fundamental relationships between assets, liabilities, revenue, cost, profits and net worth. Teams represent store owners and participants represent the president, operation manager, buyer, controller, assistant controller and public accountant. They must decide at what price to sell merchandise, whether to take on additional loans, and what to do with profits.

Game: **F.L.I.P.**
Source: Instructional Simulations, Inc.
Subject: Consumer education, economics
Grade level: Junior, senior high school-college
Playing time: 5 hours
No. of participants: 2-30
Cost: $35

A one or two-person simulation and didactic unit treating the factors of budgeting, life-style, credit management, payment schedules, investment programs, purchase options and income management. Twelve simulated periods, or one year, are conducted. Twenty different families are available as didactic units, each illustrating the role of family size, income, education, occupation, residence and related socioeconomic variables as determinants of family life income patterns.

Game: **GAME OF BRINKMANSHIP**
Source: History Simulations
Subject: International relations
Grade level: Junior-senior high school
Playing time: 3-5 hours
No. of participants: 20-45
Cost: $7.50

This simulation involves two super-powers, the United States of America and the Union of Soviet Socialist Republics, attempting to reach agreements over real-life disagreements (crises from 1945 to 1967). Background information is analyzed and negotiation takes place between the two countries.

Game: THE GARBAGE GAME
Source: Education Ventures, Inc.
Subject: Ecology
Grade level: Elementary
Playing time: Fifteen minutes to one-half hour
No. of participants: 2-6
Cost: $7

The garbage can contains 128 jigsaw pieces which make up seven colorful cartoons about household waste and how to diminish it. Participants strive to complete the cartoons for high score. In the process, they're governed by ecological principles. Pressure-packed "Greed" rounds permit them to take as many puzzle pieces as they can grab—but they are penalized if they take more than they can use constructively. A spinner governs the give-and-take of the game and the chance to "recycle" materials from the garbage container. A Household Ecology Checklist accompanies the game rules.

Game: GHETTO
Source: Bobbs Merrill Co.
Subject: Community, economics, civics
Grade level: Junior-senior high school
Playing time: 1-3 hours
No. of participants: 7-10
Cost: $24

Ghetto deals with the pressures under which the urban poor live and the choices that face them as they seek to improve their life situation. Each participant is given a fictional personal profile. He allocates his time among several alternatives: work, play, school, hustling (crime), passing time and neighborhood improvement. Participants learn, among other things, how neighborhood conditions affect them individually and how they can be improved.

Game: GUNS AND BUTTER
Source: Simile II
Subject: International economics
Grade level: Junior-senior high school
Playing time: 1 to one and one-half hours
No. of participants: 18-28
Cost: $25

Participants serve as leaders of nations who try to increase the real wealth of their country and at the same time make sure that it is secure from attack by other nations. Participants can form common markets, trade, establish alliances, defend themselves, and attack other nations.

Game: HOMESTEADERS
Source: Simile II

Subject: Western development
Grade level: Elementary-junior high school
Playing time: 10 to 15 thirty-minute sessions
No. of participants: 18-35
Cost: $10

Participants take the part of homesteaders, railroad men and land speculators in the Old West. Each of the homesteaders is told the occupation he pursued before heading out West and the amount of money he has been able to save. A map on the wall presents the land which is available for homesteading as well as the land owned by the railroad and land speculators. The homesteader receives money from the sale of crops each simulated year. Some homesteaders find that they don't have enough money to get started. Others will begin and then lose their farms because they don't have enough money to keep it going. The railroad men and land speculators are given a list of land which they have received or purchased from the state and federal governments. They attempt to sell their land at a profit and buy land from homesteaders at a very low price.

Game: IMPACT
Source: Instructional Simulations, Inc.
Subject: Community action, opportunity costs
Grade level: Junior, senior high school-college
Playing time: 6-10 hours
No. of participants: 20-35
Cost: $160

Impact is a community simulation involving participants as community members. Each participant is supplied with biographical information, memberships in various groups and differential involvement in selected key community issues based on newspaper analysis. Group problems are provided which require group members to process and resolve various alternative questions, predicaments, changes and maintenance problems.

Game: IMPORT
Source: Simile II
Subject: International trade
Grade level: Elementary-junior high school
Playing time: 10 to 20 forty-minute sessions
No. of participants: 18-35
Cost: $10

Import is a simulation of the activities of six importing firms located in various ports around the world. Each firm, made up of approximately six participants, buys exports from various countries. Those firms which are able to buy products which can be sold for a profit in their own country are declared the winners.

Game: INFLATION
Source: Paul S. Amidon & Associates, Inc.
Subject: Inflation
Grade level: Senior high school
Playing time: 1 hour
No. of participants: 33
Cost: $20

A role-playing activity which allows participants to take part in simulated aspects of the complex process of political-economic decision-making. Representing five major groups in the United States, participants attempt to influence the federal government to gain economic advantages as the government works to control inflation.

Game: THE INNER-CITY HOUSING GAME
Source: Found in *Simulation Games*, The Free Press
Subject: Inner-city housing
Grade level: Junior-senior high school
Playing time: 2½-4 hours
No. of participants: 6-10
Cost: $4.95

This simulation provides participants with a role-play experience involving inner city housing problems. The participants must find a place to live which is personally satisfactory and within certain budgetary limits. Typical housing problems are experienced and handled by each participant.

Game: INTERNATIONAL TRADE
Source: Didactic Systems, Inc.
Subject: Commerce, foreign trade
Grade level: Senior high school
Playing time: 2-5 hours
No. of participants: Teams of 6
Cost: $12 for 30 participants plus teacher's guide $3.50

Participants play the roles of competitive importers, exporters, traders and bankers. They must decide what to produce, how much to produce and what to import. The objective is to gain profits from trade and to increase general welfare.

Game: KORUPSI
Source: American Universities Field Staff
Subject: Government regulation of business
Grade level: Senior high school-college
Playing time: Up to one class period per group of players
No. of participants: 3 or more
Cost: $49.00 includes this and three other simulation games and supporting culture study materials comprising a unit of study on Southeast Asia

Participants role-play a taxi driver, street vendor or restaurant owner. The objective is obtaining a license from governmental authorities. Corruption—*Korupsi* is the Indonesian word—usually becomes an important part of acquiring this permit to do business. Play is on a board which provides critical incidents in the pursuit of the applicant's objective.

Game: THE LAND USE GAME
Source: Education Ventures, Inc.
Subject: Land development
Grade level: Junior-senior high school
Playing time: 1-2 hours
No. of participants: Open
Cost: $2.50

This game presents the interrelationships and conflicts between man and his natural environment. The participants must decide where to locate roads, recreation areas, forests, etc. for the purpose of meeting human needs and protecting the natural environment.

Game: LIFE CAREER
Source: Bobbs Merrill Co.
Subject: Career choice and opportunity costs
Grade level: Junior-senior high school
Playing time: 2-6 hours
No. of participants: 4-20
Cost: $35

Life Career contains certain features of the "labor market," the "education market" and the "marriage market" as they now operate in the United States and as projections indicate they will operate in the future. Participants work with the profile of a fictitious person, allotting his time and activities among school, studying, a job, family responsibilities and leisure time. Each team represents a teenager planning and then living through about eight years of life. The objective is to plan a life which gives specific rewards to the person whose role is assumed by the participants. It is intended to give participants some advance experience in planning for their own future.

Game: LIMITED, COMPETITIVE MARKET
Source: South-Western Publishing Co., Inc.
Subject: Competition and price determination
Grade level: Junior-senior high school
Playing time: 1 hour
No. of participants: Up to 42
Cost: Part of a set of five economic simulations, $38.00 per set. A teacher's guide accompanies the set. (See other South-Western entries.)

This game introduces the economic concepts of retail buying and selling where buyers purchase items in a given price range for resale on the retail market. Participants learn how competition affects price determination. In this game, buyers from numerous large retail outlets are sent to Mexico to buy items in a given price range that might appeal to retail customers. Participants learn about the flexibility of price determination in a market where handcrafted items are purchased for resale. The item used in Game Two is a Mexican poncho.

Game: LIMITED MARKET
Source: South-Western Publishing Co., Inc.
Subject: Supply and demand
Grade level: Junior-senior high school
Playing time: 1 hour
No. of participants: Up to 42
Cost: Part of a set of five economic simulations, $38.00 per set. A teacher's guide accompanies the set. (See other South-Western entries.)

This game introduces the economic concept of collective buying and selling. The *demand* team represents the collective ability of individuals charged with buying prom favors as representatives of their classmates from schools throughout the nation. Similarly, the *supply* team represents the collective ability of all sellers to market their wares at or above various minimum prices.

Game: LOW BIDDER
Source: Entelek, Incorporated
Subject: Management, market competition
Grade level: Senior high school
Playing time: 2-4 hours
No. of participants: 2-25
Cost: $10

Low Bidder simulates the conditions that face executives in bidding for control in manufacturing, construction, printing and many other industries. Participants learn how to select jobs on which there are apt to be relatively few bidders, how to estimate the best markup, and how to protect the company against cut-throat competition. Participants assume the roles of company managers.

Game: MACROECONOMIC POLICY GAME
Source: Prentice-Hall, Inc.
Subject: Macroeconomic policy
Grade level: Senior high school-college
Playing time: 2-10 hours
No. of participants: 15-25
Cost: Contained in book, $7.95

Macroeconomic Policy Game involves teams of participants in policy decision-making with a computer-simulated macroeconomic model of the economy. Governmental expenditures, marginal tax rates and the money supply are alternative instruments for policy control. The purpose of the game is to illustrate the complexities of a dynamic economy and the problems inherent in the use of fiscal and monetary policy to pursue the goals of economic stability and growth. This exercise was developed by Richard Attiyeh and others for a principles course, but it has been used for high ability secondary students. It can be found in a book, ***Recent Research in Economic Education***, edited by Keith G. Lumsden.

Game: MANAGING YOUR MONEY
Source: CUNA Mutual Insurance Society
Subject: Money, credit and insurance
Grade level: Junior-senior high school
Playing time: 1-2 hours
No. of participants: 2-6
Cost: $2.50 plus postage

A game designed to teach the principles of money, credit and insurance. Participants select a vocation, earn a salary and charge a fee to other participants. They save, borrow, earn dividends and pay interest. Insurance is made available to participants to protect them against "built-in" hazards.

Game: MARKET
Source: Benefic Press
Subject: Economics
Grade level: Elementary-junior high school
Playing time: 1-3 hours
No. of participants: 16-40
Cost: Game is included as part of curriculum package $51

The game attempts to help participants to discover the economic concepts of market, profit, and supply and demand. The entire class is divided into two groups, consumers and retailers. Within the groups, participants are paired to form teams and compete against each other. Retailers must buy food from a wholesaler, rent stores and establish their own selling prices. They must attempt to maximize their profits. Consumers must attempt to buy food with limited funds. Points are given for the better choices and use of the funds. The consumer team with the most points wins the game.

Game: MARKET
Source: Didactic Systems, Inc.
Subject: Economics, supply and demand
Grade level: Senior high school
Playing time: 2-5 hours
No. of participants: Teams of 6
Cost: $12 for 30 participants plus teacher's guide $3.50

The purpose of this game is to demonstrate how price is established through changing demand and supply conditions. It also illustrates the concept of diminishing returns. Participants represent buyers and must make budgeting decisions on what to consume, given a fixed budget. They must decide on quantities of goods to buy, what prices to pay for the goods, and how much money they should save. Their objective is to gain satisfaction points through purchasing goods at various prices.

Game: MARKET
Source: Digital Equipment Corporation
Subject: Market
Grade level: Elementary-junior, senior high school
Playing time: One-half to 2 hours
No. of participants: 2-10
Cost: Individual packet $2.10; classroom packet $14

This computer-assisted game allows participants to engage in company decision-making. Two companies compete in single product competition. Price, inventory and advertising decisions must be made.

Game: MARKET GAME
Source: Holt, Rinehart and Winston, Inc.
Subject: Free market economy
Grade level: Junior-senior high school
Playing time: 1-2 hours
No. of participants: 16-30
Cost: Available as part of audiovisual package, $156 approximate cost

This game is designed as a learning resource to be used in the study of free market economic relations. Developed as part of a book entitled *Comparative Economic Systems* for use in high school economics courses, the unit stresses aggregate intergroup economic actions, rather than micro features. Part of the ninth-grade section of the Holt Social Studies curriculum developed by Edward Fenton.

Game: MARKET PLACE
Source: Changing Times Education Service
Subject: Market alternatives—consumer choices
Grade level: Junior-senior high school
Playing time: Game is part of total unit. Time depends on amount of material used
No. of participants: 30
Cost: $44.50

This game is part of a unit which allows participants to make market decisions in order to maximize utility from purchases. The participants use advertising warranties and general product information for background knowledge before purchases are made.

Game: MARKETPLACE
Source: Joint Council on Economic Education
Subject: Economics, economic systems
Grade level: Senior high school-college
Playing time: 6-12 hours
No. of participants: 20-50
Cost: $75

Marketplace is a game which translates basic economic concepts participants read about in an introductory textbook into a series of transactions which simulate a microeconomic world. The economic concepts that are demonstrated by events in the game are supply, demand, dilemma of unlimited wants and limited resources, factors of production, circular flow of capital and goods, the functions of money, the influence of the profit motive, division of labor, and the market. The essence of the game is to provide participants with a systems approach to economics. This conceptual framework should then help to make appropriate economic judgments. Teams of participants role-play households and businesses: manufacturers, retailers or banks. Through a process of buying and selling participants acquire units of satisfaction. The team which acquires the most units of satisfaction by the end of the game is the winner.

Game: MENTAL HEALTH SITE DISPUTE
Source: Community Service Volunteers
Subject: Environmental community planning
Grade level: Junior high school
Playing time: 1 hour
No. of participants: 20-30
Cost: 40 pence plus postage

A role-playing simulation in which all community members make decisions as to where the new mental health site should be.

Game: MICRO-COMMUNITY
Source: Classroom Dynamics Publishing Co.
Subject: Economic community interaction
Grade level: Junior-senior high school
Playing time: Open (180 daily lesson plans provided)
No. of participants: 20-40
Cost: $35

Participants involved in this extensive simulation are faced with the problems of earning money, paying rent, contending with inflation, going into business, paying for welfare, and various social problems. This is a year long unit which can be modified for shorter periods.

Game: MICRO-ECONOMY
Source: Harcourt Brace Jovanovich, Inc.
Subject: Market
Grade level: Junior-senior high school
Playing time: Open
No. of participants: 10-30
Cost: $39

This simulation allows participants to obtain jobs, purchase land, create and use goods and services, and allocate scarce resources. The result of the game is a society where each participant has had an input.

Game: THE MONEY GAME
Source: Leswing Communications
Subject: Money
Grade level: Elementary
Playing time: One-half to 1 hour
No. of participants: 6
Cost: $6.95

Money is used in purchasing needs and wants. Participants obtain practice in handling money and budgeting their income.

Game: MONOPOLY
Source: Parker Brothers Games
Subject: Investment
Grade level: Elementary, junior-senior high school
Playing time: 1-3 hours
No. of participants: 2-8
Cost: $6.66

Participants buy, sell and swap real estate, railroads and utilities. Monopoly positions allow for higher rents to be charged other participants.

Game: MR. BANKER
Source: Federal Reserve Bank of Minneapolis
Subject: Commercial banking and Federal Reserve policy
Grade level: Junior-senior high school
Playing time: 4 forty-minute sessions
No. of participants: 6-30
Cost: $15

This simulation acquaints participants with the money and credit system of our nation and how it affects and is affected by changes in economic conditions. Its major objective is the deposit-money creation function of commercial banks and the need for a central monetary authority—the Federal Reserve System—to change the rate of growth of the money supply and the cost and availability of credit.

Game: **MUCH ADO ABOUT MARBLES**
Source: Gamed Simulations, Incorporated
Subject: Comparative systems
Grade level: Senior high school-college
Playing time: Two and one-half to 6 hours
No. of participants: 20-40
Cost: $50

A symbolic interaction simulation in which the participants experiment with a variety of economic and political systems. Participants speculate in land, build up property values, establish courts, welfare, health and education facilities.

Game: **MULBERRY**
Source: Paul S. Amidon & Associates, Inc.
Subject: Urban renewal
Grade level: Junior-senior high school
Playing time: 2-4 hours
No. of participants: 20-35
Cost: $50

This is a simulation of an urban renewal project in one community. Participants play the roles of citizens, city officials and professional planners. The objective is to combine use of federal resources in planning a government structure to redevelop an area of sixteen blocks in Mulberry, an older section of Greenbriar city. Participants must deal with problems of urban renewal, involving high-density population, poor quality housing and poor social environment.

Game: **NATIONAL ECONOMY**
Source: Didactic Systems, Inc.
Subject: Economics, national economy
Grade level: Senior high school
Playing time: 2-5 hours
No. of participants: Teams of 6
Cost: $12 for 30 participants plus teacher's guide $3.50

The purpose of the game is to aid understanding of the relationships between growth, inflation, national income and unemployment. It also shows how activity in different kinds of industries can have different effects on the economy. A model is developed simulating a nation's economic atmosphere and conditions. Participants role-play representatives of the business community on an economic policy committee, separated into three industrial groups producing consumer, luxury and producer goods. They must decide on the yearly level of investment in each of these sectors. Their objectives are to maintain full employment without inflation and to promote orderly growth of the economy.

Game: **NEW HIGHWAY**
Source: Education Ventures, Inc.

Subject: Community planning
Grade level: Elementary-junior high school
Playing time: One-half to 2 hours
No. of participants: 6-20
Cost: $4.95

As residents of Townville the participants seem to agree that Route 21 is congested with traffic and that it has become a safety hazard. But each role in the community seems to have different ideas about what to do about the problem. Some of the businessmen who own firms along Route 21 want to widen the road. The mayor wants to replace it with a superhighway. A group of conservationists suggest ways in which traffic can be reduced. Some homeowners favor a new highway—as long as it isn't built too close to their property. Each of the six interest groups is free to lobby for the position it favors before the crucial public hearing.

Game: NEW SCHOOL
Source: Education Ventures, Inc.
Subject: Community planning
Grade level: Junior-senior high school
Playing time: 1-2 hours
No. of participants: 6-20
Cost: $4.95

One of Rockland's two middle schools, the Dewey School, is badly overcrowded and in need of repair. The school board recommends that the community approve funds for a new Dewey School. Some members of a taxpayers' group, however, argue that it might be wiser to repair Dewey School and build an addition if more space is needed. Some members of the local booster club would like to see Rockland replace both of its middle schools with one big new school, complete with swimming pool and community facilities. Some parents and teachers think the community should talk about how education programs might change before deciding what kind of building it needs. The discussion climaxes with a public hearing, with participants taking the above-mentioned roles.

Game: NEW STEEL SITE—BUT WHERE?
Source: Community Service Volunteers
Subject: Environmental community planning
Grade level: Junior high school
Playing time: 1 hour
No. of participants: 20-30
Cost: 40 pence plus postage

A role-playing simulation in which all community members make decisions as to where the new steel plant should be located.

Game: NEW TOWN
Source: Harwell Associates, Inc.
Subject: Community planning
Grade level: Junior, senior high school-college
Playing time: Three-fourths to 3 hours
No. of participants: 10-20
Cost: $16 for 10 participants, $28 for 20 participants

New Town is a game of strategy involving the environmental, economic, social and political factors in building a brand-new community. Participants bid on land, vote for public buildings, participate in open discussions and make compromises which affect every player.

Game: NO DAM ACTION
Source: Instructional Simulations, Inc.
Subject: Resource management
Grade level: Junior, senior high school-college
Playing time: 6-20 hours
No. of participants: 20-40
Cost: $85

Water resource management is the theme of No Dam Action; its title was taken from a newspaper headline dealing with alternatives to flood control measures. Together with flood control, the simulation also covers problems of water resource plans, sanitation and water treatment needs, pollution abatement, lake and water use classification, plus a nuclear power plant.

Game: OLD SAN FRANCISCO GAME
Source: Leswing Communications
Subject: Trading
Grade level: Elementary
Playing time: One-half to 1 hour
No. of participants: 6
Cost: $6.95

The participants attempt to acquire needed services by trading goods. Value and scarcity determine the relative prices in the exchange.

Game: OPEN SPACE
Source: Education Ventures, Inc.
Subject: Community planning
Grade level: Elementary-junior high school
Playing time: One-half to 2 hours
No. of participants: 6-20
Cost: $4.95

Farm Hills is Newtown's last big parcel of undeveloped land. A developer's proposal to build a huge shopping center at Farm Hills stirs public debate about how the land could best be used. Some members of a slum neighborhood group think Farm Hills would make a good site for low-cost public housing. A group of parents favors using the land as a family recreation area. Some local businessmen see Farm Hills as the perfect location for a badly needed industrial park. An environmental group argues that the land will be most valuable to the community as totally undeveloped open space. The debate culminates at a public hearing, with the participants taking the predescribed roles.

Game: PACIFIC EXPRESS
Source: Berkeley Gaming Project
Subject: United States railroad development
Grade level: Senior high school-college
Playing time: 5-10 hours

No. of participants: 9-31
Cost: $20

Recapitulates the building of the transcontinental railroad from 1860 onwards. It demonstrates how the railroad ventures were organized and financed.

Game: PANIC
Source: Interact
Subject: American history, economics
Grade level: Junior-senior high school
Playing time: 23 hours
No. of participants: 25-36
Cost: $10

Panic divides the class into economic pressure groups from different regions of the United States during the period 1920-1940. Students study the prosperity of the 1920's and the depression of the 1930's. The simulation culminates in mock Congressional committees and a mock Congress trying to solve the economic crisis.

Game: PILGRIMAGE
Source: American Universities Field Staff
Subject: Comparative economic systems
Grade level: Senior high school-college
Playing time: One class period per group of players
No. of participants: 4 teams of 1, 2 or 3 players
Cost: $49.00 includes this and another simulation (BAZAAR) and supporting culture study materials comprising a unit of study

Participants role-play villagers of various ethnic groups seeking to become pilgrims to Mecca, the holy city of Islam. A board is provided which symbolically dispenses good or bad luck as players move around it. When sufficient points and/or money are earned, a player achieves the desired experience: a pilgrimage to Mecca.

Game: PINK PEBBLES
Source: Education Ventures, Inc.
Subject: Money
Grade level: Elementary
Playing time: One-half to 1 hour
No. of participants: 2-6 (board version), 36 (classroom version)
Cost: $8 for board version, $9.95 for classroom version

Participants of Pink Pebbles begin as "primitive farmers" trying to attain subsistence through settled farming. Progressing through seven levels of activity, they gain time to start handicrafts, to accumulate surpluses, to barter, and finally to specialize as owners of "stores" in an evolving market economy. Along the way, they find "pink pebbles"—meaningless at first but increasingly important as need grows for a medium of exchange.

Game: THE PLANET MANAGEMENT GAME
Source: Houghton Mifflin Company
Subject: Community planning

Grade level: Junior-senior high school
Playing time: 1-2 hours
No. of participants: 4-6
Cost: $12.75

The Planet Management Game puts participants in control of an imaginary planet with a population explosion and a pollution problem. A "cardboard computer" aids decision-making.

Game: **PLANS**
Source: Simile II
Subject: Sociology, political science, economics
Grade level: Senior high school-college
Playing time: 4-8 hours
No. of participants: 25-35
Cost: $35 for 25-participant kit, $50 for 35-participant kit

In Plans, participants are members of interest groups which use influence to produce changes in American society. There are six interest groups: military, civil rights, nationalists, internationalists, business and labor. Each group has from two to six members and communicates with other groups by written messages and scheduled conferences. During each period, the groups must decide how to use their influence points. Their decisions are given to a calculations staff which determines the consequences of the decisions on the American economy and feeds the results back to the participants. The purpose of this simulation is to inform participants of the goals of various pressure groups and to help them to understand the uses of power and influence in public life.

Game: **POLLUTION**
Source: Simulation System Program
Subject: Environment, quality of life
Grade level: Junior-senior high school
Playing time: 2 hours
No. of participants: 4-32
Cost: $22.50

This exercise, built around a series of negotiation sessions, orients participants to the increasing emphasis being placed on the environment and quality of life. It provides participants with an opportunity to understand some of the problems in coping with air, water, land and visual pollution. The game allows participants to experience the trade-offs between personal/corporate goal satisfaction and environmental quality. The developers of the game attempted to suit it to learners having little or no experience in the area.

Game: **POLLUTION GAME**
Source: Games Central
Subject: Costs of pollution and abatement programs
Grade level: Junior-senior high school
Playing time: 1-3 hours
No. of participants: 12-16
Cost: $30

The game presents community consequences of different forms of pollution—air, water, noise—and of abatement programs. Participants role-play residents, businessmen, industrialists, etc., in the community which is mapped out on a game board. Participants are faced with the dilemma of high short-term costs for abatement programs as compared to disastrous long-term effects of unabated pollution.

Game: POLLUTION GAME
Source: Houghton Mifflin Company
Subject: Ecology
Grade level: Junior-senior high school
Playing time: 1-2 hours
No. of participants: 4-6
Cost: $9.80

The Pollution Game involves participants in today's ecological crises. As they try to improve environmental quality, the profit motive complicates their efforts.

Game: POPULATION
Source: Damon/Educational Division
Subject: Industrial growth and population control
Grade level: Junior, senior high school-college
Playing time: 1 hour
No. of participants: 2-6
Cost: $10

Participants' task in this game is to develop a new planet. The planet is very much like earth and has six countries in an early agricultural era. Technology advances, forcing decisions pertaining to resource use and population control.

Game: POTLATCH GAME
Source: Games Central
Subject: Resource allocation—conspicuous consumption
Grade level: Junior-senior high school
Playing time: The game is part of a larger unit—time is dependent upon materials used.
No. of participants: 30
Cost: $60

The game recreates a ceremony common to the Pacific Northwest's Kwakiutl Indians. The ceremony sees the host (participant) trying to gain prestige by overwhelming his guests with "gifts."

Game: POWDERHORN
Source: Simile II
Subject: Political economics
Grade level: Elementary
Playing time: 1-2 hours
No. of participants: 18-35
Cost: $12.50

Powderhorn is an adaptation of the adult simulation called Starpower. In Powderhorn participants take the part of frontiersmen who establish a three-tiered society by trading rifles, traps and pelts. After a time, the participants in the highest level are given the right to make the rules for the society. They usually make rules which enable them to stay in power.

This undemocratic behavior almost always leads to a revolution of one kind or another, at which time the game is ended.

Game: PRESSURE
Source: Interact
Subject: Community development—urban economics
Grade level: Junior-senior high school
Playing time: 2-4 hours
No. of participants: 6-36
Cost: $10

Participants become citizens in a community beset by the big problems facing local government today: zoning vs. personal rights; cultural and ecological preservation vs. economic gain; school modernization in plant and curriculum vs. tradition and taxpayers. Participants become involved in these crisis situations by forming six pressure groups found in almost all communities, a Taxpayers' Association, a Chamber of Commerce, a Developers' Association, a Farmers' Cooperative, an Ecology Club, an Historical Society. Some participants are elected to a Community Council (simulating a city or town council or county board of supervisors) and a school board. Others are appointed to a Planning Commission, a Zoning Board, and a Water-Sewer Authority.

Game: PROFIT, a Simulation of Modern Trading in Southeast Asia
Source: American Universities Field Staff
Subject: International trade; imports, exports
Grade level: Senior high school-college
Playing time: One class period minimum. Can be extended with increasing sophistication among traders to five class periods
No. of participants: 20 or more
Cost: $49.00 includes this and three other simulation games and supporting culture study materials comprising a unit of study on Southeast Asia

Participants role-play Ministers of Trade of seven Southeast-Asian nations, trading agents from seven industrialized nations, and six service agents, such as bankers, who facilitate transactions. Modern economies are presented in a Southeast-Asian context.

Game: THE REDWOOD CONTROVERSY
Source: Houghton Mifflin Company
Subject: Resource allocation
Grade level: Junior-senior high school
Playing time: 1-2 hours
No. of participants: 4-6
Cost: $7.95

The Redwood Controversy has participants debate proposals for a Redwood National Park. The ecological and financial aspects of conservation efforts are brought out.

Game: SACRIFICE
Source: Education Ventures, Inc.

Subject: Environment
Grade level: Junior-senior high school
Playing time: 2-4 hours
No. of participants: 10-100
Cost: $4.95

Sacrifice is an environmental conflict game that divides the class into the kinds of interest groups that make up a real community: manufacturers, public utility executives, small businessmen, public officials, and various consumer-voter groups. Acting on the basis of their own values and attitudes, these groups attempt to reach consensus on the "right" solution to environmental problems which concern the entire community. No group is made up of "bad guys"; all want to solve the problems raised in five successive rounds: industrial water pollution, bottle and tin-can recycling, downtown traffic jams, expansion of electrical power/production, and the use of conservation funds. Yet the groups must overcome various differences about interests and values if they are to achieve agreement and action.

Game: SCARCITY AND ALLOCATION
Source: Didactic Systems, Inc.
Subject: Economics
Grade level: Senior high school
Playing time: 2-5 hours
No. of participants: Teams of 6
Cost: $12 for 30 participants plus teacher's guide $3.50

The objective is to increase the standard of living of a group of people stranded on an island. Savings are measured in hours, which, although they cannot be saved, can be spent for projects that lift the castaways above the survival level. Participants must make decisions on how to allocate time among hunting, fishing, farming, food-collecting and toolmaking. The game attempts to highlight the meaning of saving and investment and the relationships between these two economic activities.

Game: SECURITY
Source: Community Service Volunteers
Subject: Unemployment
Grade level: Junior high school
Playing time: 1 hour
No. of participants: 2-6
Cost: 2½ pounds plus postage

This game deals with the problem of unemployment. Sickness and going to the hospital, increases in rents, cuts in benefits are some of the disadvantages written into the board game.

Game: SETTLE OR STRIKE
Source: Games Central
Subject: Collective bargaining
Grade level: Junior, senior high school-college
Playing time: Open
No. of participants: 24-32
Cost: $40

This game is a role-play simulation of the collective bargaining process. Role teams represent union local and Lastik Plastic Co., as they try to reach agreement on five contract issues: wages, union security, seniority, vacations, and contract duration.

Game: SHARE THE RISK
Source: Changing Times Education Service
Subject: Insurance
Grade level: Junior-senior high school
Playing time: Game is part of a total unit. Time depends on amount of material used.
No. of participants: 30
Cost: $64.50

The game stresses the concepts of decision-making, risk-sharing, and chance-taking as they relate to the insurance area. The insurance types included are life, health, property and liability.

Game: SIERRA LEONE
Source: Board of Cooperative Educational Services (BOCES)
Subject: Social studies, economic development in African countries
Grade level: Elementary
Playing time: 2 hours
No. of participants: 1 at a time
Cost: Special arrangements with BOCES

Provides participants with an understanding of the problems of newly independent African countries, an awareness of facts about the geography and recent history of Sierra Leone, and an understanding of some economic principles as they operate in underdeveloped countries. Participants, acting as American economic advisors, may manipulate parts of the economy to effect socioeconomic improvement in the country. This computer-based unit achieves its learning objectives through role-playing and variable manipulation.

Game: SITTE
Source: Simile II
Subject: Community development
Grade level: Senior high school
Playing time: 2-4 hours
No. of participants: 25-35
Cost: $35 for 25-participant kit, $50 for 35 participant kit

Participants assume the roles of activist interest groups attempting to use their influence to produce changes in an imaginary city. The interest groups include business, the disenfranchised, government, ad hoc committees for parks and trees, and a taxpayers association. Consequences of the decisions made by the groups are reflected in Sitte indicators, including: equality of reward in Sitte, overall aesthetic rating of Sitte, profits after taxes and total taxes. The participants learn how interest groups may exert influence in effecting community change.

Game: SMOG
Source: Damon/Educational Division
Subject: Air pollution

Grade level: Junior-senior high school
Playing time: 1-3 hours
No. of participants: 2-4
Cost: $11

In this game, each participant assumes the role of an elected official in his town who is responsible for managing the quality of air. He confronts the problems of air pollution control as he moves along a "Decision Tree" making decisions which affect his financial status, popularity and the growth of the town as well as the air quality. An element of chance is also included. A participant wins the game by accumulating a certain number of "Management Credits" which are gained by his successful management of families and industries, money and votes, and the air quality of his town. The purpose of the game is to teach the problems of air pollution, city management, and the intricacies of the decision-making process.

Game: SOCIETY TODAY
Source: Dynamic Design Industries
Subject: Economic success
Grade level: Junior-senior high school
Playing time: 1-2 hours
No. of participants: 4-20
Cost: $7.95 plus shipping and handling

The participants of this game attempt to maximize their economic gains by taking advantage of all opportunities and staying clear of pitfalls. Knowledge of people and events, confidence, skills and luck all contribute to successful play.

Game: THE SPRING GREEN MOTORWAY
Source: Community Service Volunteers
Subject: Environmental community planning
Grade level: Junior high school
Playing time: 1 hour
No. of participants: 20-30
Cost: 40 pence plus postage

A role-playing simulation in which all community members make decisions as to where the new motorway should be located.

Game: STARPOWER
Source: Simile II
Subject: Distribution of wealth
Grade level: Junior-senior high school
Playing time: 1-2 hours
No. of participants: 18-35
Cost: $25 for 18-35 participant kit

This game involves students in the operation of a low mobility three-tiered society built upon the distribution of wealth in the form of chips. Participants have a chance to progress from one level of society to another by acquiring wealth through trading with each other. Once the society is established, the group with the most wealth is given the right to make the rules of the game. The purpose of the game is to serve as a device for raising questions about the uses of power in a competitive society.

Game: STOCKMARKET GAME
Source: Avalon Hill Company
Subject: Security investments
Grade level: Junior-senior high school
Playing time: 2 hours
No. of participants: 1-6
Cost: $10

This game attempts to reveal how the stockmarket works and what causes prices to rise and fall. Participants act as stockmarket investors who buy and sell securities in an attempt to accumulate the greatest net worth.

Game: STRIKE
Source: Interact
Subject: American history, economics, collective bargaining
Grade level: Junior-senior high school
Playing time: 20 hours
No. of participants: 20-40
Cost: $10

Strike simulates a late 19th-century environment with two towns: one having a steel mill, the other a coal mine. Participants play roles with conflicting goals: owners, managers, foremen, workers and unemployed. Horatio Alger effort and chance can help participants become economically successful. The situation is stimulated by two kinds of bulletins: historical bulletins which make workers aware of labor's plight throughout the United States and fate bulletins which kill or injure. Eventually, Phase I culminates in either a strike, a lockout, or fumbling attempts at collective bargaining. During Phase II, participants realize how much labor-management relations have changed when they participate in collective bargaining sessions on a contemporary case study.

Game: THE SUMERIAN GAME
Source: Board of Cooperative Educational Services (BOCES)
Subject: Anthropology, agricultural economics, civics
Grade level: Elementary
Playing time: 4-6 hours
No. of participants: 10-30
Cost: Special arrangements with BOCES

The Sumerian Game is a simulation designed for the elementary grades. It focuses on relations between government and sectors of a primitive economy. In this game, the key participant is the ruler of an imaginary nation, Sumeria, and he must allocate his resources in an agricultural environment to improve the life of his people. His success is determined quantitatively by a computer-based model.

Game: TAKE OFF II
Source: Brite Games
Subject: Third world development
Grade level: Senior high school
Playing time: 3 hours
No. of participants: 13-40
Cost: $10

The development problems of the third world are the central issue of this simulation. Participants represent the various factors within a country, each struggling against the other, for personal gain. At the same time, the country is attempting to have people work together in the drive for economic maturity. Elections, industrialization, and revolution are part of this game.

Game: TERRITORY
Source: American Universities Field Staff
Subject: Natural resources
Grade level: Senior high school-college
Playing time: One class period minimum. Can be extended with increasing sophistication over several days
No. of participants: 4 individuals or teams
Cost: $49.00 includes this and three other simulation games and supporting culture study materials comprising a unit of study on Southeast Asia

Participants role-play outside powers competitively seeking territories in Southeast Asia. Play is on a map of the region which is provided. Following acquisition of a territory, its resources are identified and may be developed.

Game: TIGHTROPE
Source: Hartmann, Clinton
Subject: Monetary and fiscal policy
Grade level: Senior high school
Playing time: 1-3 hours
No. of participants: Minimum of 3
Cost: Negotiated with developer

Tightrope is a simulation representing various historical periods of economic activity. The role of participants is to act as economic advisors to maintain economic stability and growth. They must make policy decisions dealing with periods of depression, recession, uncontrolled inflation, moderate inflation and moderate unemployment, or conditions of stability and reasonable growth.

Game: TRACTS
Source: Instructional Simulations, Inc.
Subject: Community development
Grade level: Junior-senior high school
Playing time: 2-4 hours
No. of participants: 14-40
Cost: $42.50

This simulation illustrates problems of deciding what to do with scarce land in the core city. Participants form into teams and role-play four sectors or interests competing for influence in an urban land development situation. The interest groups include private land developers, public housing authorities, industry and a city planning commission. The teams must make decisions on resource allocation and development policy. The purpose of the simulation is to illustrate to participants the opportunities, arguments and actions of various community sectors when land cannot serve equally the interest of all parties without compromise and negotiation.

Game: TRANSACT
Source: Addison-Wesley Publishing Company

Subject: Market
Grade level: Junior, senior high school-college
Playing time: 1 hour
No. of participants: 20-48
Cost: $6

Transact simulates a wholesale market with cords of wood representing the product being sold. Buyers attempt to purchase cords of wood at the lowest cost possible, while sellers try to get the highest price they can. As each attempts to minimize cost or maximize profit, the market tends to stabilize or move toward equilibrium where the prices sellers are asking and buyers are offering are the same.

Game: TRANSACTION, THE AUTHENTIC STOCK-MARKET GAME
Source: Study-Craft Educational Products
Subject: Stocks and bonds
Grade level: College
Playing time: 1-4 hours
No. of participants: 4-12
Cost: $10 plus shipping and handling

This role-play simulation allows participants to buy and sell stocks of existing companies. Company information and stock prices are provided.

Game: TRANSIT
Source: Instructional Simulations, Inc.
Subject: Transportation
Grade level: Junior, senior high school-college
Playing time: 4-10 hours
No. of participants: 20-40
Cost: $42.50 plus shipping

Transit provides data and background information for simulated public sectors, planners and local officials to deal with problems of transportation. Mass transit, freeway development, parking, safety standards and others are problems dealt with in this simulation.

Game: TRANSPORTATION GAME
Source: Games Central
Subject: Travel costs comparison by mode
Grade level: Elementary and remedial
Playing time: 1-3 hours
No. of participants: 8-34
Cost: $16

The game involves participants in planning, arranging and "taking" trips via different modes of passenger transportation. Participants are presented with specific transportation problems for which arrangements must be made with other students who act as agents for different travel modes—car, bus, railroad or airplane.

Game: TRIANGLE TRADE
Source: Simulation System Program
Subject: History, economics
Grade level: Junior-senior high school
Playing time: 1-3 hours

No. of participants: 15-44
Cost: $15

This is a historical simulation that explores the slave trade, the economic structure of the New England colonies, and the mercantile philosophy of Great Britain during the 17th century. The purpose of the exercise is to help participants to learn why the New England colonies did not fit into the British mercantile system; why the British government opposed the triangle trade route; and what was the relationship of the British mercantile system to the economic development of New England. Participants assume the roles of the major historical parties in the triangular trade route of the 17th century.

Game: URBAN DYNAMICS
Source: Urbandyne
Subject: Community development—urban economics
Grade level: College
Playing time: 3-4 hours
No. of participants: 12-20
Cost: $95

Urban Dynamics illustrates the basic structures and processes of the real city, simplified sufficiently for participants to conceptualize interlocking urban systems. A game session provides an overview of a city, including all of the following factors: political organization, welfare, zoning and land use, urban/suburban interaction, taxation, unemployment, social and racial stratification, economic growth, transportation, population growth, residential patterns and education. *Options:* Model cities, health, pollution, megalopolis and media.

Developing on a game board, Urban Dynamics progresses by ten-year periods from the recent past into the future. Four teams of participants relate to each other as representatives of the socioeconomic groups found in modern cities. Since the teams are assigned resources and restraints, their decisions and actions arise from a spontaneous reaction to the game situation rather than from an "acting out" of assigned roles. The teams may either compete or cooperate as they deal with all the aspects of city life noted above; and they also have the opportunity to come together in City Council meetings to make decisions affecting the entire city.

Game: WALRUS
Source: Urbex Affiliates, Inc.
Subject: Community planning—resource use
Grade level: Junior-senior high school
Playing time: 2-4 hours
No. of participants: 5-25
Cost: $75 plus postage

The Water and Land Resources Use Simulation (WALRUS) is designed to focus on the impact of public and private decisions on water pollution. WALRUS is played by five teams, each of which is free to invest in any of the five land uses provided in the game. Different water requirements and sewage generation factors are assigned to the different land uses. Land uses considered in the model include heavy and light industry, recreation, simple and advanced farming, retail stores, and residential developments of varying density. In addition, municipally owned land uses include water and sewage treatment plants, municipal service buildings, schools, and parks.

Game: WELFARE WEEK
Source: Gamed Simulations, Incorporated
Subject: Welfare
Grade level: Senior high school-college
Playing time: Two 2-hour sessions
No. of participants: 6-600
Cost: $13.50

Participants simulate living on a welfare budget. They must go through intake, are given a caseworker, and assigned a budgetary allotment. Periodic crises force the players to make crucial financial decisions.

Game: WHEAT GAME
Source: Joint Council on Economic Education
Subject: Agriculture, supply and demand
Grade level: Junior, senior high school-college
Playing time: 1-3 hours
No. of participants: 20-60
Cost: $4.50 including teacher's manual

Wheat Game is a role-playing simulation in which students participate as buyers and sellers of wheat in a purely competitive market. The objective of the game is to simulate how a market will reach an equilibrium price level. This exercise is available in *Teacher's Manual, Readings in Economics for 12th Grade Students of American Democracy* (Pittsburgh DEEP materials), and in *American Economic Review* (May 1965).

Game: WHEELS
Source: Paul S. Amidon & Associates, Inc.
Subject: Personal economics
Grade level: Senior high school
Playing time: 2-4 hours
No. of participants: 3-35
Cost: Sample set $2.50, complete series $40

This computer-based simulation is designed to provide students with experience in purchasing and maintaining a car successfully for one year. The experience includes purchase of car, selection of method of financing, choice of insurance and provision for running expenses. The computer randomly assigns accidents, major repairs and unexpected events, and calculates running expense. It is also available through Honeywell time-sharing (EDINET) Centers.

Game: WHERE DO WE LIVE?
Source: Scott, Foresman and Company
Subject: Community planning
Grade level: Elementary
Playing time: 1-4 hours
No. of participants: 30
Cost: $19.80

Participants create a natural environment which they then develop. Communities and cities are planned for the purpose of meeting human needs without harming the quality of the environment.

CHAPTER IV

Bibliographies, Journals, and Publishers of Educational Games and Simulations

Chapter IV is devoted to other bibliographies describing games and simulations which have been produced in or relating to the social studies; current journals and newsletters which address themselves to simulation games; and current addresses for publishers of games and simulations. This chapter should be of assistance to teachers who are interested in staying up-to-date with respect to information on simulation games and to teachers wishing to order specific games.

A. Bibliographies

Klietsch, Ronald G., *Involvement Learning Digest*. Minneapolis, MN: Learning Systems, Inc., 1973. Order from Ross & Haines, Inc., 11 East Lake St., Minneapolis, MN 55408. Yearly subscription, $18.75.

Nesbitt, William A., *Simulation Games for the Social Studies Classroom*, second edition. New York, NY: The Foreign Policy Association, 1971, 144 pages, $2.00.

Livingston, Samuel A., and Clarice Stasz Stoll, *Simulation Games*. New York: The Free Press, 1973, 43 pages, $4.95.

Charles, Cheryl L., and Ronald Stadsklev, Editors, *Learning with Games: An Analysis of Social Studies Educational Games and Simulations*. Boulder, CO: The Social Science Consortium, Inc., and the ERIC Clearinghouse for Social Studies, 1973, 168 pages, $4.95.

Zuckerman, David W., and Robert E. Horn, Editors, *The Guide to Simulation/Games for Education and Training*, second edition. Lexington, MA: Information Resources, Inc., 1973, 500 pages, $15.00 cash, billing price $17.00.

B. Journals and Newsletters

Simulation and Games: An International Journal of Theory, Design and Research. Sage Publications, 275 South Beverly Drive, Beverly Hills, CA 90212 (4 issues yearly, $18.00).

SAGA Journal (Simulation and Gaming Association). R. R. #2, Greentree Road, Lebanon, OH 45036 (4 issues yearly, $5.00).

Simulation/Gaming/News (S/G/N). Box 3039, University Station, Moscow, ID 83843 (5 issues yearly, $4.00).

C. Names and Addresses of Distributors and Publishers

Addison-Wesley Publishing Company
2725 Sand Hill Road
Menlo Park, CA 94025

American Universities Field Staff
3 Lebanon Street
Hanover, NH 03755

Paul S. Amidon & Associates, Inc.
5408 Chicago Ave. So.
Minneapolis, MN 55417

Avalon Hill Company
4517 Harford Road
Baltimore, MD 21214

Benefic Press
10300 W. Roosevelt Rd.
Westchester, IL 60153

Berkeley Gaming Project
Institute of Urban and Regional Development
316 Wurster Hall
University of California
Berkeley, CA 94720

Board of Cooperative Educational Services (BOCES)
845 Fox Meadow Rd.
Yorktown Heights, NY 10598

The Bobbs Merrill Co.
4300 West 62nd Street
Indianapolis, IN 46268

Brite Games
Box 371
Moline, IL 61265

Changing Times Education Service
(A Division of The Kiplinger Washington Editors, Inc.)
Dept. C
1729 H Street N.W.
Washington, DC 20006

Classroom Dynamics Publishing Co.
231 O'Connor Drive
San Jose, CA 95128

Community Service Volunteers
237 Pentonville Road
London N1 9NJ, England

CRAC (Careers Research and Advisory Centre Limited)
Bateman Street
Cambridge, England

CUNA Mutual Insurance Society
5910 Mineral Point Road, P.O. Box 391
Madison, WI 53701

Curriculum Development Associates, Inc.
Suite 414
1211 Connecticut Ave. N.W.
Washington, DC 20036

Damon/Educational Division
80 Wilson Way
Westwood, MA 02090

Didactic Systems, Inc.
Box 4
Cranford, NJ 07016

Digital Equipment Corporation
(Huntington Computer Project)
146 Main Street
Maynard, MA 01754

Dynamic Design Industries
1433 N. Central Park
Anaheim, CA 92802

Educational Games Company
Box 363
Peekskill, NY 10566

Education Ventures, Inc.
209 Court Street
Middleton, CT 06457

Entelek Incorporated
42 Pleasant Street
Newburyport, MA 01950

Federal Reserve Bank of Minneapolis
250 Marquette Ave.
Minneapolis, MN 55480

The Free Press
(A Division of Macmillan Publishing Co., Inc.)
866 Third Avenue
New York, NY 10022

Gamed Simulations Incorporated
P.O. Box 1747, F.D.R. Station
New York, NY 10022

Games Central
c/o Abt Associates Inc.
55 Wheeler Street
Cambridge, MA 02138

Harcourt Brace Jovanovich, Inc.
757 Third Avenue
New York, NY 10017

Hartmann, Clinton
Education Center
100 W. Rio Grande
El Paso, TX 79902

Harwell Associates, Inc.
Box 95
Convent Station, NJ 07961

History Simulations
P.O. Box 2775
Santa Clara, CA 95051

Holt, Rinehart and Winston, Inc.
383 Madison Ave.
New York, NY 10017

Houghton Mifflin Company
110 Tremont Street
Boston, MA 02107

Instructional Simulations, Inc.
2147 University Ave.
St. Paul, MN 55104

Interact
P.O. Box 262
Lakeside, CA 92040

Joint Council on Economic Education
1212 Avenue of the Americas
New York, NY 10036

John Knox Press
Box 1176
801 East Main St.
Richmond, VA 23209

Leswing Communications
750 Adrian Way
San Rafael, CA 94903

The Macmillan Publishing Co., Inc.
866 Third Avenue
New York, NY 10022

Parker Brothers Games
Salem, MA 01970

Prentice-Hall, Inc.
Englewood Cliffs, NJ 07632

Reese, Jay
3235 West 17th Avenue
Eugene, OR 97402

Scott, Foresman and Company
1900 East Lake Ave.
Glenview, IL 60025

Simile II
P.O. Box 1023
1150 Silverado
La Jolla, CA 92037

Simulation System Program
P.O. Box 1028
Corvallis, OR 97330

South-Western Publishing Co., Inc.
5101 Madison Road
Cincinnati, OH 45227

Study-Craft Educational Products
R1-683, Tusson Research Center
Belle Chasse, LA 70037

Urbandyne
5659 S. Woodlawn Ave.
Chicago, IL 60637

Urbex Affiliates, Inc.
474 Thurston Road
Rochester, NY 14619